Use of Lean and Agile Commercial Supply Chain Practices in Humanitarian Supply Chains

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Pia Huxel

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Summary

In humanitarian aid organisations, due to increasing pressure from donors, there is an urge to professionalise and optimise the way supply chains are managed. In the commercial companies there is strong evidence that focusing more on supply chain management can improve efficiency and lead to major cost savings which makes it very interesting for humanitarian aid organisations to adopt practices from the commercial world. The concepts of agility and leanness are said to prepare organisations to respond quickly to fluctuating customer demand (agility) and to increase efficiency through waste elimination and process optimisation (leanness), two properties which are required by humanitarian and commercial organisations likewise. In the commercial context agility and leanness are often combined as a le-agile strategy which is also applicable for humanitarian supply chains where the distinct humanitarian supply chain stages – preparedness, response, and reconstruction – follow different objectives and operate in different environments.

Based on existing literature, this thesis identifies and examines the combination of lean and agile strategies with the different humanitarian supply chain stages. The combination possibility for a le-agile strategy is based on the base-surge demand approach from commercial literature. Moreover, agile and lean supply chain characteristics as well as practices how to achieve these characteristics are identified and illustrated in a theoretical framework. The empirical, qualitative research using a single-case study strategy further explores the supply chain practices of the Georgia Red Cross Society (GRCS) during the armed conflict in 2008. These lean and agile practices were studied by looking at preparedness, response and recovery stages related to the event, as well as the new preparedness phase, emerged after the armed conflict.

The key findings indicate that lean practices are performed by the case organisation in the preparedness stage and to some lower extent in the reconstruction stage. Agile practices were evidenced in the response stage of the armed conflict. Overall, the findings support the theoretical propositions made prior to the empirical research. However, in the case of the studied organisation, the findings indicate that not all lean practices, identified from the commercial supply chain literature, were applied in the preparedness and reconstruction stages likewise. Nevertheless, in general there was a tendency for using lean practices in both stages of humanitarian supply chain. Another finding indicates that lean and agile practices are strongly linked and support each other. This was clearly reflected in an interconnection between preparedness and response stages, whereas implementation of efficient lean practices during the preparedness stage supported a quick and agile reaction to the armed conflict in the response stage. Additionally, it was found out that the reconstruction and preparedness stages of the GRCS humanitarian supply chain are connected through an iterative process of continuous learning and improvements.

This thesis contributes to existing literature by providing empirical proof for the existence of lean and agile strategies in the preparedness, response, and reconstruction stages of the case organisation’s humanitarian supply chain. These results also support the possibility to use the commercial base and surge demand model for combining lean and agile strategies with the different humanitarian supply chain stages, which represents an under-investigated field in existing humanitarian supply chain literature.
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List of Abbreviations

GRCS - Georgia Red Cross Society
HRNN - Harm Reduction National Network
ICRC - International Committee of the Red Cross
IFRC - International Federation of Red Cross and Red Crescent Societies
IT – Information Technologies
NGO – Non-Governmental Organisation
SCM – Supply Chain Management
UN – United Nations
UNHCR - The UN Refugee Agency
VCA - Vulnerability Capacity Assessment
1 Introduction

The increasing number of natural and man-made disasters all over the world alongside donor’s growing demand for more transparency and accountability for their money urges humanitarian aid organisations to professionalise and optimise the way they manage their operations (Oloruntoba & Gray, 2006, p. 115). About eighty percent of these humanitarian aid operations are related to supply chain management activities (Van Wassenhove, 2006, p. 475), indicating the increasing interest of logistics researchers and practitioners towards cross-learning opportunities between commercial and humanitarian operations (Kovács & Spens, 2011, pp. 32-33, 2007, pp. 99-100). In the commercial world there is strong evidence that focusing more on supply chain management can improve efficiency and lead to major cost savings (Christopher & Towill, 2000, p. 210) which makes it very interesting for humanitarian aid organisations – facing increasing pressure of donors and larger numbers of disasters – to adopt practices from the commercial companies (Pettit and Beresford, 2005, p. 329). This application of practices is suggested by several authors (Scholten et al., 2010, pp. 632-633; Tatham & Pettit, 2010, pp. 610-611) despite some differences in the nature of the supply chains, such as the short and unstable existence of humanitarian supply chains (Oloruntoba & Gray, 2006, p.118).

The concepts of agility and leanness had their origin in manufacturing; however later they were extended to be applied to supply chains (Christopher, 2000, p. 37). Christopher & Towill (2000, p. 206) define agility as a business wide capability with the main focus on flexibility. Adding to this definition, Mason-Jones & Towill (1999, p. 61) describe agility as the ability to exploit opportunities in unstable markets by using market knowledge and information enriched collaborations. In the commercial context the concept of agility is increasingly deemed relevant for maintaining business and even survival in a volatile and highly competitive environment (Charles et al., 2010, p. 723). Agile supply chain strategies are said to prepare organisations to respond quickly to fluctuating customer demand which requires a high level of adaptability as well as a high responsiveness to market needs (Naylor et al., 1999, p. 108). In contrast leanness is about increasing efficiency by reducing waste in terms of obsolete or improvable supply chain processes. Lean strategies typically aim at cost-effectiveness by “doing more with less”. This includes process optimisation and value stream analysis techniques (Towill & Christopher, 2002, p. 302).

In particular agile supply chain strategies have been set in context with humanitarian supply chains either in its pure form or combined with lean principles in the form of a “le-agile” hybrid strategy (Cozzolino et al., 2012, p.17). The reason for this is the high level of turbulence, uncertainty, and urgency that are predominant during disasters (Oloruntoba & Gray, 2006, pp. 115-117). After the occurrence of a disaster, humanitarian organisations must be able to respond immediately and in the most effective way because time acts upon saved human lives (Cozzolino et al., 2012, pp.16-17). Thus, humanitarian supply chains require a high level of flexibility, highlighting a major similarity to the commercial supply chain context where learnings can be achieved. Much research has focused on the applicability of agile strategies to the humanitarian supply chain with less focus on lean or hybrid strategies (Cozzolino et al., 2012, p.17). The humanitarian supply chain process can be divided into three main phases – preparedness, response and reconstruction. All three
phases operate in different environments and follow different strategic objectives. Thus, it can be assumed that there is not one general strategy to be implemented for the entire supply chain (Holguín-Veras et al., 2012, p. 494). Instead, it is likely that within each stage the focus will shift towards placing a higher importance on either lean or agile concepts depending on the environment and objective of each supply chain stage. However, existing research mainly focuses on the supply chain as a whole, paying less attention to the specific requirements of the different supply chain stages (Charles et al., 2010; Oloruntoba & Gray, 2006; Taylor & Pettit, 2009). Cozzolino et al. (2012) analysed an appropriate combination of agile/lean strategies together with the distinct supply chain stages. However, out of the preparedness, the response, and the reconstruction phases, empirical research was only undertaken for the response and reconstruction stages with an in-depth analysis of solely the agile practices. The best combination of lean and agile strategies with respect to the specific supply chain stages is deemed important to utilise scarce resources in the most beneficial way and to be able to react quickly to disasters (Cozzolino et al., 2012, p. 17).

Given the described gap, the aim of this thesis is to identify a possible combination of humanitarian supply chain stages with the lean/agile strategies. Besides, the thesis aims to explore and test the commercial supply chain practises that are required to achieve leanness and agility characteristics for the preparedness, response, and reconstruction stages of the humanitarian supply chain.

For this purpose the humanitarian supply chain of the GRCS was selected and investigated. This investigation primarily focused on the armed conflict between Georgia and Russia in August 2008. Armed conflicts can be classified as man-made slow-onset disasters although some authors view it as a separate category alongside to natural and man-made disasters with the assumption that most humanitarian aid organisations do not get involved during the active fights and do not have access to the combat zone (Van Wassenhove, 2006, p. 476). According to Leiras et al. (2014, pp. 108-109), who consider armed conflicts as parts of man-made disasters, previous research mainly focused on man-made sudden-onset disasters, such as terrorist attacks, with less attention paid to man-made slow-onset disasters, such as armed conflicts. The reason for the low attention for these types of disasters is assumed to be their high level of complexity and difficulty to access. This gap motivates the primary focus of this research on the GRCS supply chain practices during the above mentioned armed conflict in 2008.

1.1 Research question and objectives

The previous explanations of the gaps in existing research build the basis for the purpose of this study. The present thesis attempts to answer the following research questions:

RQ 1: How can lean and agile strategies of commercial supply chains be combined with the humanitarian supply chain preparedness, response, and reconstruction stages?

RQ 2: What practices supporting lean and agile strategies from commercial supply chains are applied during the preparedness, response, and reconstruction stages of the humanitarian supply chain?
The thesis on hand pursues two objectives which are aligned with the above mentioned research questions:

- The first objective is to identify and examine an appropriate combination of lean/agile strategies from commercial supply chains with the humanitarian supply chain stages – preparedness, response, and reconstruction. This objective shall be achieved through conducting an extensive analysis of commercial and humanitarian supply chain literature, which aims to answer the first research question.
- The second objective is to investigate lean and agile practices derived from existing literature on commercial and humanitarian supply chains and to test the use of these practices in the humanitarian supply chain preparedness, response, and reconstruction stages.

1.2 Outline of the thesis

The Introduction in section 1 sets the theoretical background and defines the research gap, the research question, and objectives of this study. The Literature review in section 2 builds the theoretical basis for this thesis. First, lean and agile characteristics of commercial supply chains are identified. This is followed by an examination of possible hybrid, so called le-agile strategies. Subsequently, differences and similarities of commercial and humanitarian supply chains are investigated which sets the base for the comparison of both supply chains. This is followed by a description of the separate humanitarian supply chain stages and an investigation of lean and agile practices in existing humanitarian supply chain literature. Limitations of existing research and the development of a theoretical framework conclude the second section.

The Methodology in section 3 specifies the philosophical stance of this thesis. This is followed by a description of the research strategy and an explanation of the chosen case study strategy with its limitations and implications how to overcome them. The consecutive sub-section states the selected qualitative research approach and provides an explanation of this choice. The Research Design in section 4 first argues for the literature selection process that has been applied in this thesis. Subsequently, the data collection process is specified including an explanation of the case selection and a description of the background of the event. Further, the case study organisation is specified. Following, the method of semi-structured interviews is stated and reasoned. The criteria for qualitative research and ethical considerations underlying this thesis conclude the fourth section.

The Data Analysis in section 5 defines the chosen data analysis strategy and justifies the selected template analysis technique. Further, the interview results are investigated and displayed. The Discussion in section 6 analyses the interview findings and reverts to existing theory of the literature review. The discussion part is divided into preparedness, response, and reconstruction stages, which is aligned with the purpose of this thesis - to investigate the specific stages separately. The Conclusions in section 8 also provide managerial and theoretical implications, followed by limitations and further research suggestions.
2 Literature review

This section gives a comprehensive review of existing literature related to commercial and humanitarian supply chains, as well as to lean and agile strategies. After a detailed analysis of the above mentioned literature, a theoretical framework is introduced which sets the base for the empirical research of the thesis on hand.

2.1 Commercial Supply Chains

From the beginning of the 21st century, companies are facing growing competition combined with dramatic changes on the global market, which is reflected in reduced product lifecycles, increased market volatility, unpredictable demand and unstable supplies. Customer requirements and growth in their expectations are the basis for the turbulent market environment formation (Abtahi & Khalili-Damghani, 2011, p. 264). Customer’s desires increase which is reflected in demanding better products and services in the shortest possible time and at low prices (More & Babu, 2009, p. 30). Keeping focus on customer satisfaction is crucial for companies as it leads to gaining competitive advantage on markets (Agarwal et al., 2006, p. 212). Therefore, getting the right product, at the right price, at the right time to the customer is not only the linchpin to competitive success but also the key to survival (Christopher & Towill, 2001 p. 235). Companies must be able to increase their flexibility in order to stay competitive and respond to market changes swiftly (Stevenson & Spring, 2007, p. 686). All the above mentioned arguments push businesses to revise their visions and priorities, and to adapt and create new practices in order to respond to volatile market and dynamic business environments successfully (Abtahi & Khalili-Damghani, 2009, p. 264; More & Babu, 2009, p. 59).

According to Christopher (2000, p. 39) in the current business reality the competition takes place among supply chains and not the companies anymore. Childerhouse & Towill (2000, p. 338) introduce the key objectives of supply chain management for survival, such as market share improvement and revenue generation, which can be achieved through customer satisfaction. Indeed, literature suggests that the performance of the supply chain – either success or failure - is directly assessed by the end users in the marketplace (Christopher, 2000, p. 39). Supply chain management represents a flow of materials and goods from suppliers to end users. It is the complex system of purchasing, manufacturing, distribution and sales functions (Christopher, 1992, pp. 66-67). Supply chains are seen as value chains that require collaborations with different functions inside the company as well as strong partnerships with external organisations (Whitten et al., 2012, pp. 28-29). Stevens (1989, p. 3) defines the supply chain as “a system whose constituent parts include material suppliers, production facilities, distribution services and customers linked together via the feed forward flow of materials and the feedback flow of information”.


While considering the total value creation process of the entire supply chain the focus must be put not only on the long-term upstream partnerships with suppliers, but also on the downstream relationships with clients and competitors (Yusuf et al., 2004, pp. 381-382).

2.1.1 Theories underlying Supply Chain Management

The shifted focus towards competition among supply chains entails an increased emphasis on the managements’ decisions. The complex nature of supply chains, the management of scarce resources, and the required networks with collaborating organisations demand the consideration of several organisational theories that underlie supply chain management. The knowledge about these theories is required to understand and support supply chain decision-making (Halldorsson, 2007, p. 284). The theoretical foundation for supply chain management is broad and includes transaction cost analysis, principal-agent theory, network theory, and the resource-based view (Halldorsson, 2007, p. 285). The first two theories are said to determine the structure of supply chains. The latter two theories aim at the management of the supply chain. Thus, for the purpose of this thesis in particular network theory and resource-based view were considered. These theories are not explicitly related to lean and agile strategies of supply chains but they are closely related to supply chain management in general. Both theories were deemed important for this thesis since they were found in connection with several of the lean and agile practices which will be introduced in the following sections.

Network theory can support organisations to understand how each party can benefit from a collaborative relationship characterised through exchanging knowledge, resources, and competences (Gadde et al., 2003, p. 363). In these relationships, the resources of two organisations are combined in order to create new competences. The aim is to achieve a greater advantage in a joint activity than in an individual effort (Håkansson & Ford, 2002, p. 134). Another important aspect are mutual improvements through reciprocal learning is considered (Håkansson et al., 1999, p. 450). Network theory is seen relevant for supply chain management due to its focus on long-term relationships between the supply chain members that are characterised by trust and collaboration. Collaborative partners often possess mutual IT systems that are used for communication and information sharing (Halldorsson, 2007, p. 289).

The Resource-based view looks at how companies can achieve competitive advantage through the possession and use of unique resources and capabilities. Those are used by
organisations to build core competences which support them to react quickly to situational changes and to develop new competencies. Competitive advantage depends on a company’s ability for internal competence development (Prahalad & Hamel, 1990, p. 82). Especially in the context of supply chain management, this can also be supported by inter-organisational learnings and mutual commitments (Halldorsson, 2007, p. 288).

2.1.2 Lean and Agile Characteristics of Commercial Supply Chains

Nowadays the complexity of the business environment where supply chains operate in is characterised by high risk, uncertainty and instability related with products, markets, prices, new technologies, material availabilities, multiple cultures, and collaborations with partners (More & Babu, 2009, p. 30). These challenges must be faced and responded to by companies effectively and efficiently. However, focusing on just cost and quality is not enough. According to Lee (2004, p. 102), “the best supply chains are not just cost-effective, they are also agile, adaptable and they insure that all their companies’ interests stay aligned”. Responsiveness of the supply chain has also been identified as crucial by the literature in order to ensure high levels of manoeuvrability and speed (Agarwal et al, 2007, p. 443; Christopher, 2000, p. 38). Thus, supply chains are in a need of increased speed and flexibility to manage the high level of volatility (More & Babu, 2009, p. 31; Yusuf et al., 2004, p. 379). Flexibility has proven to be a success in various business processes where it brings a number of benefits to organisations. Considering the above mentioned the companies put a focus on supply chain flexibility - to ensure its effectiveness and efficiency (More & Babu, 2009, p. 30). Flexible supply chains demonstrate high adaptability and responsiveness to demand changes and supply distributions, focusing on the high level of customer service (Stevenson & Spring, 2007, p. 687). More & Babu (2009, p. 35) define the supply chain flexibility as “the ability to adapt to internal and/or external environmental changes with a specific speed inherently associated with it”. This turbulent business environment builds a base for the increased interest towards lean and agile principles in the supply chain as a means of enhanced flexibility, effectiveness and efficiency. The ability of the firm to respond to the volatile market requirements is referred to as agility, while lean is about “doing more with less” (Christopher, 2000, p. 37).

The history of the agility in the business context starts from “Flexible Manufacturing Systems” (FMS). At the beginning, flexibility in manufacturing was achieved via automation that enabled companies to implement changes swiftly in product varieties or quantities. Later, the notion of “manufacturing flexibility” was expanded to the broader business scale and the idea of agility - as an organisational practice emerged (Christopher, 2000, p. 37). Flexibility represents the main characteristics of agility.

Leanness differs from agility. The rise of lean concepts is associated with lean manufacturing that started with the Toyota Production System (TPS). Based on Ohno (1988) it was aiming at the elimination or reduction of waste. Lean manufacturing itself focused on “zero inventory” and “Just in time” approaches (Womack & Jones, 1996, p. 140). As the TPS principles proved to be a success in manufacturing, the lean principles have been promoted beyond the factories and the idea of lean thinking was born (Christopher, 2000, p. 38).
The lean and agile strategies are present at the supply chain level as well, contributing to increase its effectiveness and efficiency. The literature mostly refers to the definitions of leanness and agility provided by Naylor et al. (1999, p. 108):

“Agility means using market knowledge and a virtual corporation to exploit profitable opportunities in a volatile market place.”

“Leanness means developing a value stream to eliminate all waste, including time, and to ensure a level schedule.”

In order to benefit from lean and agile strategies, company’s supply chains primarily build on their relevant characteristics. These characteristics are achieved by accomplishing certain requirements through specific practices.

2.1.3 Agile Supply Chain Characteristics

Based on the literature the key characteristics for the agile supply chain can be identified as follows: responsiveness, flexibility/adaptability and quickness/speed (Agarwal et al., 2007, p. 443; Christopher, 2000, p. 38; Lin et al., 2006, p. 287; More & Babu, 2009, p. 30;). In order to acquire the mentioned characteristics the agile supply chain should implement certain approaches and practices, such as market sensitivity, information integration, process integration and network building (Christopher, 2000, pp. 38-39; Lin et al., 2006, p. 288).

*Market sensitive* supply chains are concerned with “the ability to read and respond to real customer requirements, and also to master change and uncertainty” (Lin et al., 2006, p. 288). It focuses on having the demand-driven rather than forecast-driven approach. It is related to possessing direct information flows from marketplaces and customers by using information technologies (IT) and efficient consumer response (ECR) forms to capture the data (Christopher, 2000, p. 38).

*Information integration* means having “the ability to use IT to share data between buyers and supplies, thus effectively create a virtual supply chain” (Lin et al., 2006, p. 288). It is information-based instead of inventory-based. It focuses on unlimited information and data sharing among suppliers and buyers through Internet and Electronic data interchange (EDI) (Christopher, 2000, p. 38).

*Process integration* describes “collaborative working between buyers and suppliers, joint product development, common systems, and shared information” (Lin et al., 2006, p. 288). It represents the buyer-supplier partnerships and alliances including joint product development, shared systems and information. Nowadays the need for partnerships is increasing as companies tend to outsource many activities for achieving better results. Process integration triggers the need for information transparency, joint strategies, and open-book accounting (Christopher, 2000, p. 39).

*Network based* supply chains show “the ability to attract the buyers and suppliers to work collaboratively, jointly develop products and share information” (Lin et al., 2006, p. 288). It is based on the idea that for increasing the responsiveness and flexibility, companies should
have the capability to build firm structured relationships with partners to guarantee the strength and access to competences (Christopher, 2000, p. 39).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Requirements</th>
<th>Practices</th>
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<tbody>
<tr>
<td>- responsiveness</td>
<td>Market sensitive</td>
<td>- IT</td>
</tr>
<tr>
<td>- flexibility</td>
<td></td>
<td>- efficient consumer response (ECR) forms</td>
</tr>
<tr>
<td>- adaptability</td>
<td>Information</td>
<td>- information and data sharing among suppliers and buyers through Internet</td>
</tr>
<tr>
<td>- quickness</td>
<td>Integration</td>
<td>- information and data sharing among suppliers and buyers through Electronic data interchange (EDI)</td>
</tr>
<tr>
<td>- speed</td>
<td>Process integration</td>
<td>- information transparency</td>
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<td></td>
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<td>- joint strategies</td>
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<td></td>
<td></td>
<td>- open-book accounting</td>
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<tr>
<td></td>
<td>Network building</td>
<td>- structured relationships with partners</td>
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<td></td>
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<td>- access to shared competences</td>
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Table 1: Characteristics, approaches, practices of the agile supply chain

By building the characteristics of the agile supply chain, robustness and better functioning are achieved as well as efficient (low cost) and effective (timely) deliveries are guaranteed (Lin et al., 2006 p. 287).

2.1.4 Lean Supply Chain Characteristics

In order to ensure continuous improvement, time compression, and waste reduction, certain lean approaches and practices are required to be addressed (Ugochukwu et al., 2012, p. 87). The literature refers to the following approaches: identification of value from the end customer view, mapping value streams, establishing the system flow of steps, letting the customer pull the products, and striving for perfection (Womack & Jones, 1996, p. 141).

For the elimination and reduction of waste it is important for the supply chain to define the value of the product or service from the customer’s point of view in terms of quality, time, and price. Knowing exactly customer’s perception of the value they are willing to pay for will enable companies to focus on certain activities essential for value creation and waste compression. Mapping the entire value stream is the long chain of activities, related to product definition, information management, and physical transformation. In other words it includes mapping the whole process from product design and manufacturing, precise order and delivery planning, and raw material transformation into a final product. Thus, the number of departments within the organisation and also external companies are included in the process. The risk of having unnecessary activities is immense and thus, requires specific attention. Establishing the system flow of steps is vital. It considers “working on each design, order, and product continuously from beginning to end” in order to ensure the absence of scrap and downtimes between the different activities and steps (Womack &
Jones, 1996, p. 141). For creating the systematic approach, this stage normally emerges the need of innovative technologies within the organisations. Letting the customer pull the product calls to “design and provide what the customer wants only when the customer wants it”. This is related to inventory management and represents the key point for the elimination of waste. Striving for perfection refers to the continuous process of problem searching and waste elimination. As the whole value chain runs continuously, there is always the chance for improvements to deliver the value to the market that the customer wants (Womack & Jones, 1996, p. 141).

Literature revealed the mostly used practices contributing to the fulfilment of lean approaches: just-in-time (JIT), employee involvement, root cause analysis (5Whys), value stream mapping (VSM), setup time reduction-single minute exchange ideas (SMED), statistical quality control, production levelling, standardized work, pull system, small lot size, visual factory management, supplier involvement, customer involvement, continuous improvement (Cudney & Elrod, 2011, p.6; Pettersen, 2009, p. 132; Ugochukwu et al., 2012, p. 88). Based on the literature review Ugochukwu et al. (2012, p. 93) claim that for achieving the lean principles the JIT, supplier integration and VSM represent the mostly used tools in commercial supply chains.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Requirements</th>
<th>Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>- continues improvement</td>
<td>Identify the value from the end customer view</td>
<td>- Customer Involvement</td>
</tr>
<tr>
<td>- time compression</td>
<td></td>
<td>- Value stream mapping</td>
</tr>
<tr>
<td>- waste reduction</td>
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<tr>
<td>Mapping value streams</td>
<td>Mapping value streams</td>
<td>- Value Stream mapping</td>
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<tr>
<td></td>
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<td>- Visual Factory Management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- JIT</td>
</tr>
<tr>
<td>Establishing the flow of steps</td>
<td>Establishing the flow of steps</td>
<td>- Small lots size</td>
</tr>
<tr>
<td>Letting the customer pull the products</td>
<td>Letting the customer pull the products</td>
<td>- SMED</td>
</tr>
<tr>
<td>Striving for perfection</td>
<td>Striving for perfection</td>
<td>- Continue Improvements</td>
</tr>
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<td></td>
<td>- Trainings</td>
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<td>- Value stream mapping</td>
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<td>- 5Whys</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Employer involvement</td>
</tr>
</tbody>
</table>

Table 2: Characteristics, approaches, and practices of the lean supply chain

2.1.5 Overlapping elements of Lean and Agile Supply Chains

Although lean and agile strategies follow different priorities as described in the previous section, existing research suggests that both strategies often complement each other and
show overlapping elements (Towill & Christopher, 2002, p. 300). Naylor et al. (1999, p. 109) compare lean and agile elements and their overlapping nature by ranking their importance as “essential”,” “desirable” and “arbitrary”. Table 3 demonstrates this comparison.

<table>
<thead>
<tr>
<th></th>
<th>Lean</th>
<th>Agile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of market knowledge</td>
<td>Essential</td>
<td>Essential</td>
</tr>
<tr>
<td>Information integration</td>
<td>Essential</td>
<td>Essential</td>
</tr>
<tr>
<td>Lead time compression</td>
<td>Essential</td>
<td>Essential</td>
</tr>
<tr>
<td>Eliminate waste</td>
<td>Essential</td>
<td>Desirable</td>
</tr>
<tr>
<td>Rapid reconfiguration</td>
<td>Desirable</td>
<td>Essential</td>
</tr>
<tr>
<td>Robustness</td>
<td>Arbitrary</td>
<td>Essential</td>
</tr>
<tr>
<td>Level scheduling</td>
<td>Essential</td>
<td>Arbitrary</td>
</tr>
</tbody>
</table>

Table 3: Ranking of lean and agile characteristics (adapted from Naylor et al., 1999, p.109)

Use of the market knowledge, reducing the lead time and integrated supply chain are seen as equally important features and basis for both - lean and agile approaches development (Naylor et al., 1999, p. 110). High quality product and total lead-time reduction are also recognized as common requirements for leanness and agility. The compressed total end-to-end lead time enables companies to increase agility which is essential for responding quickly to highly volatile markets. Additionally, compressed lead-time is always related with efficient bottom-line enhancements in industrial productivity and cost, directly ensuring waste elimination (Christopher & Towill, 2001, p. 238, Towill, 1996, p. 17).

2.1.6 Hybrid le-agile approach

Christopher and Towill (2000, p. 207) introduce the concepts of “market qualifiers” and “market winners” which can be used for identifying the applicability of lean and agile concepts to particular situations. The qualifiers are defined as starting points for entering the competition; however, just qualifiers are not enough for success. In order to win the competition certain capabilities are required, referred to as market winners. As the business and consequently the supply chain focus on customers and end-user satisfaction in order to gain competitive advantage, the main aim is to deliver total value.

Johansson et al. (1993) introduce value as a combination of the following characteristics: Service, Quality, Cost and Lead-time which can be referred to as market qualifiers and market winners. However, it is important to stress that the market winners can vary time by time. The market winner criterion for the certain year can be replaced and moved to the group of qualifiers for the next year. Thus, the authors suggest that winning the competition needs the appropriate adapted supply chain strategy. Considering the above mentioned arguments, the concepts of the lean and agile supply chains are linked with “qualifiers” and “winners”. If cost represents the “winning” criterion then the lean approach adaption in the supply chain will be more beneficial, however in case of the major focus on services the agile paradigm would deliver the best results (Mason-Jones et al., 2000, p. 4064).
**Agile supply**  
(critical when service & customer value enhancement is in focus)  
1. Quality  
2. Cost  
3. Lead time  

**Lean supply**  
(most powerful with cost as winning criterion)  
1. Quality  
2. Lead Time  
3. Service Level  

<table>
<thead>
<tr>
<th>Market qualifiers</th>
<th>Market winners (winning criterion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Quality</td>
<td>1. Quality</td>
</tr>
<tr>
<td>2. Lead Time</td>
<td>2. Lead Time</td>
</tr>
<tr>
<td>3. Service Level</td>
<td>3. Service Level</td>
</tr>
</tbody>
</table>

Table 4: Concept of market qualifiers and market winners (adapted from Mason-Jones et al., 2000)

Although in many cases successful lean approaches contribute to increased efficiency, applied separately they lack the capability to respond to customer’s precise requirements promptly, where agile principles would increase effectiveness and deliver better results when combined with lean approaches. In case of rather predictable demand lean concepts make more sense, whereas facing highly turbulent and unpredictable markets with unstable customer requirements agile principles lead to success (Childerhouse & Towill, 2000, p. 345; Christopher, 2000, p. 38). The need to refer to both approaches as a hybrid strategy named “Le-agility” emerged (Childerhouse & Towill, 2000, p. 337; Christopher, 2000, pp. 39-40; Naylor et al., 1999, p. 117) since “a supply chain may need to be lean for part of the time and agile for the rest” (Christopher, 2000, p. 40). Naylor et al. (1999, p. 117) define le-agility as “carefully combining both lean and agile paradigms” and see its adaption to the commercial supply chain vital for the companies. Additionally, market and customer requirements are never the same. Different customers are characterised with different specificities. Thus, the “one size fits all” approach is not always able to deliver the same range of success. This urges the adaptability of supply chains (Childerhouse & Towill, 2000, p. 338).

Christopher and Towill (2001, p. 239) provide three ways of mixing lean and agile principles ensuring to deliver values, availability and low cost for customers at the same time. These approaches are: the Pareto curve approach, de-coupling point approach and separation of “base” and “surge” demands approach.

(1) **Pareto curve approach**

The Pareto curve approach is based on the 80/20 rule, which in business analyses is explained as “80 percent of total volume will be generated from just 20 percent of the total product line”. According to Koch (1997) the ways of how the 20 and 80 percent are managed, differ significantly. In the case of supply chains 20 percent can be addressed as predictable demand products and accordingly benefit from lean principles, whereas 80 percent would be considered as volatile thus applying agile principles would be more beneficial (Christopher & Towill, 2001, pp. 239-240).
(2) De-coupling point approach

The de-coupling point approach represents another way of combining agile and lean principles. Due to the limited knowledge about actual demand supply chains are mostly forecast-driven instead of demand-driven (Christopher, 2000, p. 41). The increased flexibility can be achieved by using de-coupling points to locate the inventory strategically (Christopher & Towill, 2001, p. 240; Naylor et al., 1999, p. 107). The idea of the de-coupling point is strongly linked with the postponement concept of agile supply chains, which indicates the allocation of inventory in a “generic semi-finished products” form and delaying the final assembly of the material until the real market demand is identified (Christopher & Towill, 2000, p. 210; Naylor et al., 1999, p. 108). The “material de-coupling point” should be allocated in a short distance from the final market place. (Christopher & Towill, 2000, p. 210). As the demand up to the de-coupling point is fuzzy and “forecast-driven” and it becomes “demand-driven” after, “the challenge to supply chain management (SCM) is to seek to develop “lean” strategies up to the de-coupling point, but “agile” strategies beyond that point” (Christopher, 2000, p. 42; Christopher & Towill, 2001, pp. 240-241; Naylor et al., 1999, p. 112). However together with “material de-coupling point” the focus should be made on “information de-coupling point” as well, which ensures the timely and precise information flow of the real final demand. (Christopher & Towill, 2000, p. 210; Mason-Jones & Towill, 1997, p. 138).

(3) Separation of “base" and “surge" demands

Gattorna & Walters (1996) stress the success of mixed strategies by dividing the demand into “surge” and “base” clusters. “Base” demand is normally predictable based on past historical records, while “surge” demand lacks the possibility to be forecasted. In this case the level scheduling can be applied to balance “surge” demand by “base” production (see the Figure 2). Considering the characteristics of leanness and agility, “base” demand is addressed with lean principles, whereas “surge” demand can be balanced by agility that might require more expenses. However the properly adapted supply chain is capable to address both types of demands simultaneously. The solution can be achieved via separation of demands in time or space. In other words, the company can split production lines, as well as use slack periods to producing materials for base-stocking (Christopher & Towill, 2001, p. 241).

![Figure 2: Smooth scheduling for the "base" and "surge" demands (Christopher & Towill, 2001)](image-url)
The literature recommends supply chains to focus on identifying the best combination of lean and agile principles in a hybrid le-agile approach (Christopher & Towill, 2001, p. 242).

### 2.2 Humanitarian Supply Chains

Humanitarian logistics was long regarded as not more than a necessary expense (Kovács & Spens, 2011, p. 35) without putting too much attention to its processes and disregarding the logistics’ functions in the strategic planning (Thomas & Mizushima, 2005, p. 60). This resulted in logistics’ position as pure support with little focus on improvement initiatives (Van Wassenhove, 2006, p. 475). Another reason for the poor development of humanitarian logistics is the lack of funding for investments into the supply chain (Beamon & Balcik, 2008, p. 11). Financial donations are usually targeted at the immediate response to a disaster and only a little percentage of funds is attributed to improvements in humanitarian logistics (Thomas & Kopczak, 2005, p. 5; Scholten et al., 2010, p. 624). However, following the 2004 Tsunami in Southeast Asia and the huge logistical chaos during the relief operation, more public attention was drawn to the need of effective humanitarian supply chains (Thomas & Kopczak, 2005, p. 5). This also resulted in a considerable increase of academic research which had been limited until 2005 (Leiras et al., 2014, p. 98). Financial donor’s increasing demand for greater transparency of the whole supply chain and for delivering relief items to beneficiaries in a more cost-effective way led to an increasing awareness of aid organisations that improvements of the entire supply chain are necessary to increase effectiveness and efficiency of logistics operations (Leiras et al., 2014, p. 109). The International Federation of Red Cross and Red Crescent Societies (IFRC) was one of the first international organisations which placed supply chain management as key to relief operations (Van Wassenhove, 2006, pp. 475-476) recognising that enhancements in supply chain management directly affect the ability of aid organisations to respond to disasters (Leiras et al., 2014, p. 96). However, in many cases humanitarian supply chain processes still remain largely manual processes with a high improvement potential (Thomas & Mizushima, 2005, p. 60).

The terms “logistics” and “supply chain management” are often used interchangeably (Taylor & Pettit, 2009, p. 432). Likewise in the humanitarian context there is no generally accepted definition of these terms. A widely used definition which has been developed by an advisory board of senior representatives of the major international aid organisations and non-governmental organisations defines humanitarian logistics as

> “the process of planning, implementing and controlling the efficient, cost-effective flow and storage of goods and materials, as well as related information, from point of origin to point of consumption for the purpose of meeting the end beneficiary’s requirements.” (Thomas & Mizushima, 2005, p. 60).

The humanitarian supply chain tasks include preparedness, planning, design, procurement, transportation, warehousing, distribution, tracking and tracing of goods, recipient satisfaction (Thomas & Mizushima, 2005, p. 60; Van Wassenhove, 2006, p. 479).

A humanitarian supply chain usually consists of (government) donors providing financial or in-kind donations on the far upstream side, suppliers, aid organisations, logistics service
providers, and beneficiaries at the furthest downstream side (Beamon & Balcik, 2008, p. 8; Oloruntoba & Gray, 2006, pp. 115-116). The broader supply chain network has several stakeholders, such as local governments, the military, the media as information bearer, and other aid organisations competing for scarce donations and media attention (Van Wassenhove, 2006, p. 477). The increasing number of various stakeholders often with contradicting goals exacerbates the coordination of these parties (Dubey et al., 2014, p. 367) although a successful coordination highly impacts the results of relief operations (Paché, 2010, p. 322).

### 2.2.1 Characteristics of commercial and humanitarian supply chains

Humanitarian and commercial supply chains are said to have many differences regarding funding, employment, location, and urgency. However, there are also strong similarities mentioned by several authors which allow and trigger the application of commercial supply chain concepts to the humanitarian organizations (Taylor & Pettit, 2009, p. 430). Nevertheless, also commercial supply chain concepts are often industry dependent and require some industry knowledge and adjustment before they can be applied across industries. Thus, before transferring supply chain practices from the commercial to the humanitarian context it is necessary to understand these differences and similarities (Beamon & Balcik, 2008, p. 6). Subsequently, the main distinct characteristics of humanitarian and commercial supply chains shall be examined.

Humanitarian supply chains need to operate under extreme *environmental conditions* with a high level of complexity and uncertainty regarding the scale and location of a disaster as well as the expected demand of relief items (Day et al., 2012, pp. 24-25). Immediate actions and a high responsiveness to disasters are crucial since every minute saved acts upon the number of human lives saved (Cozzolino et al., 2012, p. 16). Although a rapid response to changes is also a substantial capability in commercial supply chains, the overall conditions within which the supply chains are operating are usually less chaotic and extreme. However, also commercial supply chains increasingly face the challenges of demand volatility due to market turbulences (Charles et al., 2010, pp. 722-723) demanding a high level of supply chain flexibility.

From a *customer perspective*, commercial organisations typically focus on fulfilling the end customer’s needs since this is the person who is paying for the product (Oloruntoba & Gray, 2009, p. 489). In the humanitarian supply chain there are two customers whose needs have to be fulfilled. These are the beneficiary who is receiving the relief items and the donor who voluntarily provides the money for the relief operation (Charles et al., 2010, pp. 722-723). Beneficiaries’ needs are difficult to forecast and depend on the situational context, thus supply and demand are highly fluctuating.

The *supplier network* in the commercial supply chain usually consists of a limited number of partners whereas in the humanitarian supply chain especially in-kind donations might be sent by several unknown organisations alongside deliveries of known suppliers (Beamon & Balcik, 2008, pp. 9-10). Humanitarian supply chains also often deal with dormant supply chain partners where the business relationship is not built on basis of frequent transactions as it is usually the case in the commercial companies, but on a just-in-case relationship
where goods are requested right after the occurrence of a disaster (Kovács & Spens, 2011, pp. 36-37).

This is also influenced by the different life span of the humanitarian and the commercial supply chain. In the humanitarian context the supply chain is often short-term and transitory which demands the most effective operation already in the initial stage of a relief operation. After the disaster occurrence, depending on the location and the situational context, often new supply chains have to be created calling for quality and improvement at the same time (Van Wassenhove, 2006, p. 477). In contrast, many commercial supply chains, once set up, require time but also have the time to reach a certain efficiency level through iterative improvement cycles (Taylor & Pettit, 2009, p. 442).

Another important point is the fulcrum of the supply chain. In commercial supply chains the manufacturing activity is often the major part of supply chain which is also reflected by the suggested supply chain concepts. In humanitarian supply chains the major activity is more likely to be a materials management and distribution function in which goods are coordinated (Taylor & Pettit, 2009, p. 432).

Despite certain differences, both supply chains share common activities such as strategic planning for a better preparedness, procurement, transport and capacity planning, inventory management, warehousing, distribution, human resource management and continuous improvement initiatives (Pettit & Beresford, 2009, pp. 453-461). Within both supply chains there are usually three types of flows which are material flows in form of physical goods, information flows coordination the physical flows, and financial flows in form of payments, and contract arrangements (Van Wassenhove, 2006, pp. 485). The proper management of these activities and flows is necessary in order to achieve a common goal of commercial and humanitarian supply chains which is to get the right goods, to the right place and to distribute them to the right people at the right time (Van Wassenhove, 2006, p. 479) by using the scarce resources in the most efficient way (Scholten et al., 2010, p. 625). Table 5 and 6 summarise different and common characteristics of commercial and humanitarian supply chains.

<table>
<thead>
<tr>
<th></th>
<th>Commercial supply chain</th>
<th>Humanitarian supply chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental conditions</td>
<td>Market turbulences leading to demand volatility.</td>
<td>High level of uncertainty (scale, location &amp; demand), urgency, &amp; complexity.</td>
</tr>
<tr>
<td>Customer perspective</td>
<td>Final customer is end user &amp; payee of the product</td>
<td>Two customers: end used = beneficiary; donor = payee of items</td>
</tr>
<tr>
<td>Supplier network</td>
<td>Limited number of partners.</td>
<td>Several known &amp; unknown supplies &amp; in-kind donors.</td>
</tr>
<tr>
<td>Supply chain life span</td>
<td>Long-term focus of operation.</td>
<td>Short-term &amp; transitory.</td>
</tr>
<tr>
<td>Fulcrum</td>
<td>Often manufacturing at the centre of supply chain.</td>
<td>Material management &amp; distribution as centre activity.</td>
</tr>
</tbody>
</table>

Table 5: Different characteristics of commercial and humanitarian supply chains
Commercial supply chain | Humanitarian supply chain
---|---
Supply chain activities | Strategic planning, procurement, transport & capacity planning, warehousing, inventory & human resource management, continuous learning.
Types of flows | Existence of material, information, financial flow.
Common goal | Get right goods to right place and people in the right time.

| Table 6: Common characteristics of commercial and humanitarian supply chains |

### 2.2.2 Stages of humanitarian supply chains

The humanitarian supply chain process is generally divided into four different stages. These are the mitigation and preparedness phase before the disaster event occurs and the response and reconstruction phase subsequent to the disaster event (Van Wassenhove, 2006, pp. 480-481; Holguín-Veras et al., 2012, p. 496) as illustrated in Figure 3.

![Four stages of the humanitarian supply chain process](image)

The objective of the *mitigation phase* is to decrease the risks of a disaster event. Possible mitigation actions in disaster prone areas include special building regulations for location and architecture of new houses or training initiatives for local communities how to behave in case of an event (Van Wassenhove, 2006, p. 460). Although the mitigation phase is important it will not be further discussed in the course of this thesis since these initiatives are usually performed by local government.

The *preparedness phase* is crucial since the activities performed in this phase aim at decreasing the response time and thus, avoiding the most severe consequences of a disaster. The activities in this phase are often compared to strategic planning activities in the private sector (John et al., 2012, p. 505). According to Van Wassenhove (2006, p. 481) the preparedness phase should consist of five critical elements. The first element, *human resource management*, is essential since the hiring and training of people with special coordination and planning skills for relief operations is crucial. The second element which is *knowledge management*, stresses the importance of capturing previous knowledge and using it for continuous learning approaches. *Process management* which is the third
element typically encompasses the pre-positioning of critical supplies in central warehouses close to disaster prone areas to enable a faster reaction (Holguín-Veras et al., 2012, p. 496). Besides, process management activities could include building strong networks with suppliers (Cozzolino et al., 2012, p. 20) and choosing alternative suppliers and modes of transport (Van Wassenhove, 2006, p. 481). Setting up IT systems to ensure the information flow along the supply chain and to increase visibility is also part of process management activities (John et al., 2012, p. 499). Financial resource management aims at preparing sufficient money to operate which also includes having a buffer fund available for an immediate response to a disaster even before donors can be reached. The last element which is managing collaborations aims at finding ways to cooperate with governments, military, and other aid organisations. Although the impact of a disaster cannot be entirely reduced, it can be said that the better the preparation, the more effective will be the response (Van Wassenhove, 2006, p. 480). Since donors are more open to provide money for immediate disaster response actions with more hesitation to donate for preparedness activities (Kovács & Spens, 2007, p. 110; Van Wassenhove, 2006, p. 482) it can be assumed that the focus in this phase is on achieving efficiency for a quick response in the most cost-effective way possible.

In the response phase it is all about speed and providing immediate relief for disaster victims (Van Wassenhove, 2006, p. 480). The short-term activities emphasise on providing goods and services to minimize urgent threat to human health and survival (Beamon & Balcik, 2008, p. 5). Supply chains need to be established under high-stress and chaotic conditions. Additionally, local infrastructure might be completely destroyed requiring alternative modes of transports (Petit & Beresford, 2009, p. 450). Success of the response stage depends strongly on the pre-disaster preparedness phase (John et al., 2012, p. 512). The response phase focuses on effective actions with the objective of saving time, and thus saving more lives (Cozzolino et al., 2012, p. 22).

The reconstruction phase is long-term oriented and thus, may continue for years after the disaster. It is often embedded in development activities focusing on community self-sufficiency and rehabilitation (Beamon & Balcik, 2008, p. 5). Activities may include the restoration of infrastructure or the distribution of food supplies to prevent malnutrition. The aim is to help disaster victims to return back to normality (Holguín-Veras et al., 2012, p. 497). One important activity is to develop local instead of global supplier partnerships in order to strengthen the local economy (Kovács & Spens, 2011, p. 35). In the reconstruction phase the demand should become more predictable and the environment might become more stable (Taylor & Pettit, 2009, p. 437). Thus, the focus shifts to operational efficiency (Van Wassenhove, 2006, p. 481) with the objective to save more lives by saving costs (Cozzolino et al., 2012, p. 22).

2.2.3 Existing lean and agile research for humanitarian supply chains

For the improvement of the supply chain, several suggestions have been made to apply commercial supply chain concepts to the humanitarian context (Charles et al., 2010; Oloruntoba & Gray, 2006; Scholten et al., 2010). Especially the agile and lean strategies have been connected to the humanitarian supply chains since the increase in effectiveness and efficiency resulting from the application of these commercial concepts could lead to
reduced costs, a reduction in bottlenecks and a faster response to the beneficiary’s needs (Scholten et al., 2010, p. 628). Due to the characteristics of humanitarian supply chains as summarised in Tables 5 and 6 and researcher’s claims that these supply chains must be flexible to respond to disasters primarily agile concepts were transferred from the commercial context (Dubey et al., 2014, p. 369). However, since a holistic supply chain view has not been generally prioritised by aid organisations it can be assumed that large amounts of waste have been accumulated in terms of obsolete or non-existent processes influencing the actual aid reaching the beneficiaries in an unfavourable way (Taylor & Pettit, 2009, p. 431). This has motivated researchers to additionally focus on the applicability of lean concepts as well as on testing le-agile – hybrid strategies in the humanitarian context.

Most research on hybrid strategies examines the humanitarian supply chain without looking at the phases (mitigation, preparedness, response, reconstruction) separately. This research usually analyses the le-agile strategy by considering the de-coupling point through inventory postponement. However, this approach focuses strongly on its origin in the manufacturing context and the assumption that inventory can be held in form of generic materials which are customised based on consumer needs. It considers a lean approach upstream the supply chain towards the raw materials manufacturer and an agile approach downstream the decoupling point towards the customer (Christopher & Towill, 2000; Cozzolino et al., 2012; Oloruntoba & Gray, 2006; Scholten et al., 2010). Some authors also mention the possibility to combine lean and agile strategies by separating base and surge demand or by using the Pareto Curve approach (Cozzolino et al., 2012, p. 19; Christopher & Towill 2001, pp. 239-240; Pettit & Beresford, 2009, p. 463); however, this idea is not further developed (Tylor & Pettit, 2009, p. 442). Another stream of research on the applicability of agile and lean supply chain principles focuses on separate stages of the humanitarian supply chain process (Cozzolino et al., 2012). Here, most research is undertaken for the preparedness and response phase with less focus on the reconstruction phase (Kovács & Spens, 2007, p. 110; Leiras et al, 2014, p. 108).

2.2.4 Agile characteristics in humanitarian supply chains

In existing research on required agile characteristics of humanitarian supply chains, especially flexibility, enhanced responsiveness, and collaboration are mentioned as being most relevant (Charles et al., 2010, p. 725; Dubey et al., 2014, pp. 371-372). Slack (1991, p. 19; cited in Beamon & Balcik, 2008, p. 22) further specifies flexibility capabilities which have been translated to the humanitarian context, one being the ability to react to disasters of different magnitude which is based on the number of affected people (“volume flexibility”). Additionally, due to the urgency of response actions it is important to consider the time a relief chain needs to respond to a disaster (“delivery flexibility”). Besides, “mix flexibility” has been translated to the humanitarian context as the ability to deliver different types of items to the beneficiaries.

Enhanced responsiveness, the second agile characteristic, is the ability to respond to changes within an appropriate time frame (Oloruntoba & Gray, 2006, p. 118). Charles et al. (2010, p. 725) connect it to the capability of being reactive which is the ability to evaluate and take needs into account quickly. Additionally, velocity as being able to cover needs...
quickly and visibility as being able to monitor goods along the entire supply chain have been linked by these authors to enhanced responsiveness.

The demand for collaboration is in line with humanitarian researchers building their research on van Hoek’s (2001; cited in Cozzolino et al., 2012, pp. 18-20 and Oloruntoba & Gray, 2006, p. 118) framework describing elements of an agile supply chain in commercial supply chains. All parties involved in the supply chain are required to collaborate by aligning their processes and by building networks. This is also applicable among different aid organisations where harmonised customs procedures, inter-agency purchasing consortia, or combined basket funding schemes with donors could facilitate and speed up the relief operations for all parties involved (Kovács et al., 2011, p. 41). Communicating openly with the supply chain partners and building strong dependable logistics systems are relevant rules for achieving agility (Cozzolino et al., 2012, pp. 18-20).

Agile humanitarian supply chains also need to be customer and market sensitive, thus oriented towards movements and changes in the operating environment and customer needs (Oloruntoba & Gray, 2006, p. 118). There is an absolute and urgent need for a continuous and timely exchange of information among supply chain actors which van Hoek describes as the necessity of virtual integration. This element can be linked to the ability of agile supply chains to allow transparent and visible information flows as highlighted by Charles et al. (2010, p. 725). Through virtual integration humanitarian supply chains are said to become more information-based which is deemed critical to the success of relief operations. However, collecting and exchanging information is very difficult in the humanitarian context due to the uncertain environment (Oloruntoba & Gray, 2006, p. 118).

2.2.5 Lean characteristics in humanitarian supply chains

In existing humanitarian research, the commercial supply chain technique of Value Chain Analysis has been considered as method to apply lean concepts to humanitarian supply chains (Taylor & Pettit, 2009, pp. 434-435). The main focus is on minimising costs and time by eliminating waste and optimising cycle times while still achieving the aspired service level. Several principles of Value Chain Analysis can be translated to the humanitarian context. One of them is to better understand and assess the need of the beneficiaries by improving and structuring the tools and approaches used for this exercise. Improved needs assessment processes would ensure that the right products are delivered to the disaster locations in the right quantities. In most cases special on-call teams are sent to the disaster locations within the first hours after the occurrence with the goal to estimate the required goods and quantities (Beamon & Balcik, 2008, p. 9). However, especially after the Tsunami in Southeast Asia in 2004 it was criticised that many assessment teams did not include logisticians leaving out their professional contribution (Kovács & Spens, 2011, p. 33).

Improved demand management is a further approach to reduce waste in a supply chain where demand variability usually creates difficulties regarding resource requirements. In the humanitarian context, there is a demand surge for medical goods, blankets, tents, food, etc. right after the disaster occurs which needs to be addressed. Afterwards the demand usually stabilises towards the reconstruction phase. Demand management is very closely
linked to inventory management. Although inventory is usually seen as “waste” and as not being lean, it is relevant in humanitarian supply chains to hold a reasonable amount of inventory in order to be able to quickly respond to the needs arising from disasters. This inventory can be pre-positioned in central warehouses in disaster-prone areas although this requires some higher investments (Kunz et al., 2012, p. 2). Towards the reconstruction phase where demand is more stable, demand forecasts can possibly be developed and inventory reduced. In order to gain an appropriate inventory level, humanitarian organisations can first conduct potential demand assessments and further take into consideration the previous knowledge of supplier lead times. Close collaborations with suppliers facilitate inventory management which in turn can speed up the processes in the supply chain.

Lead time reduction approaches are part of time compression initiatives which aim at reducing the cycle time in the supply chain by accelerating physical and information flows. Humanitarian organisations can map all processes in the supply chain and measure the time it takes from disaster occurrence to the delivery of the product to the beneficiary. Similar to their commercial counterparts, aid organisations can implement time-based key performance indicators for the entire process and sub-processes, such as the time it takes from the onset of a disaster until the needs assessment exercise is completed. This process reduces waste by highlighting unnecessary steps in the supply chain. Another important approach of Value Chain Analysis is the identification of product losses along the supply chain. Elimination of losses from the supply chain will require the use of systems to track and trace product and inventory (Taylor & Pettit, 2009, pp. 434-435). Analysing all processes of a supply chain in combinations with lessons learned of previous disasters can be very powerful to optimise the performance of the supply chain (Van Wassenhove, 2006, p. 481).

2.3 Contribution to existing literature

Due to the different operational environments and strategic objectives of the distinct humanitarian supply chain stages – preparedness, response, and reconstruction – it can be assumed that there is not one general strategy to be implemented for the entire supply chain (Holguín-Veras et al., 2012, p. 494). Instead it is likely that within each stage the focal point will shift towards placing a higher importance on either lean or agile concepts depending on the environment and objective of each supply chain phase. In section 2.1.6 of this thesis three approaches have been described how lean and agile strategies can be combined by using the Pareto curve, the de-coupling point, or the base-surge demand approach. In the thesis on hand, Towill & Christopher’s (2002) suggestion to combine lean and agile practices based on a time/space matrix and considering base and surge demand will be applied to the context of humanitarian supply chains. According to Towill & Christopher (2002) a proportion of total expected demand - which represents the base demand - is sourced ahead of demand occurrence applying a lean strategy with focus on waste reduction. This strategy is deemed most suitable for the preparedness and reconstruction phases where resource scarcity requires the most efficient actions and where a lower urgency allows obsolete or faulty processes to be revised. In the preparedness phase the “same space” dimension is not completely correct since the disaster location can never
be truly forecasted, however under the assumption that humanitarian organisations should use pre-positioning of goods in central warehouses in disaster prone areas, the space dimension is narrowed down. According to Towill & Christopher (2002) agile supply chain strategy would be applied in order to meet the surge demand. This strategy seems to be most applicable and shall be tested for the response phase where demand abruptly shoots up and immediate actions are required.

Cozzolino et al. (2012) conducted research on an appropriate combination of agile/lean practices with the specific supply chain stages; however, the before mentioned researchers focus on two supply chain stages and conduct empirical testing only for agile practices. Much other existing research focuses on lean and agile practices in humanitarian supply chains disregarding the specific requirements of the different supply chain stages (Charles et al., 2010; Oloruntoba & Gray, 2006; Taylor & Pettit, 2009). An optimal combination of lean and agile practices, taking into account the distinct supply chain stages, provides the opportunity to make the best use of scarce resources under strict time constraints which is the key to success in relief operations (Cozzolino et al., 2012, p. 17). The thesis on hand aims to contribute to existing literature in two ways. Firstly, in the preceding section an appropriate combination of lean/agile strategies in consideration with supply chain stages will be explored. Secondly, the applicability of commercial lean and agile practices shall be tested for the three main stages of the humanitarian supply chain – preparedness, response, and reconstruction – using a theoretical framework which will be introduced in the following section.

2.4 Theoretical Framework

The literature review section discusses the different characteristics of agile and lean supply chains as well as practices how these characteristics can be achieved. The similarities of commercial and humanitarian supply chains as well as existing research indicate that these practices could be transferred to humanitarian supply chains. However, due to the differences of both supply chains these practices and requirements need to be context adjusted. Figure 4 introduces a theoretical framework which suggests lean and agile characteristics based on existing literature for the different humanitarian supply chain stages – preparedness, response, and reconstruction. The framework also demonstrates the practices which can be conducted by humanitarian organisations in order to fulfil the requirements which will lead to the acquisition of these lean and agile characteristics. The practices in the theoretical framework were derived from the commercial agile and lean practices that were listed in tables 1 and 2. These practices were context adjusted for humanitarian supply chains by taking into account existing humanitarian supply chain literature as discussed in sections 2.2.4 and 2.2.5. In the theoretical framework within each supply chain stage, the practices and requirements are numbered in order to indicate their connection. The final objective is to increase the efficiency and effectiveness of the supply chain.

In the course of this thesis the identified lean and agile practices shall be tested for the supply chain of one humanitarian organisation qualitatively using semi-structured interviews.
Saved time and cost $\rightarrow$ increased efficiency and effectiveness

**Lean characteristics:**
- Waste elimination
- Optimal cycle times
- Continuous improvement

**Agile characteristics:**
- Flexibility
- Responsiveness
- Speed
- Robustness

**Lean characteristics:**
- Waste elimination
- Optimal cycle times
- Continuous improvement

**Requirements:**
- (1) Network building
- (2) Proper inventory management
- (3) Identifying product losses
- (4) Accurate demand management
- (5) Knowledge management

**Requirements:**
- (1) Network building
- (2) Market/customer sensitivity
- (3) Process integration
- (4) Virtuality
- (5) Knowledge management

**Requirements:**
- (1) Network building
- (2) Proper inventory management
- (3) Identifying product losses
- (4) Accurate demand management
- (5) Knowledge management

**Practices:**
- (1) Supplier networks
- (2) Inventory pre-positioning
- (3) Inventory reporting system
- (4) Needs assessment
- (5) Trainings/lessons learned

**Practices:**
- (1) Collaborative relationships
- (2) Needs assessment
- (3) Aligned processes
- (4) Continuous info exchange

**Practices:**
- (1) Supplier networks
- (2) Inventory pre-positioning
- (3) Inventory reporting system
- (4) Needs assessment
- (5) Trainings/lessons learned

**Preparedness**
Objective: efficiency
Environment: stable
$\rightarrow$ **Lean strategy** „base demand“

**Response**
Objective: effectiveness
Environment: chaotic & uncertain
$\rightarrow$ **Agile strategy** „surge demand“

**Reconstruction**
Objective: efficiency
Environment: more predictable
$\rightarrow$ **Lean strategy** „base demand“

Figure 4: Theoretical framework
3 Methodology

This section discusses the thesis’s methodological stance as described through different existing philosophical positions with their respective ontological and epistemological assumptions. The section further demonstrates how the methodological stance builds the base for and is aligned with the choice of the research strategy, the research approach, and the research method of this thesis.

3.1 Philosophical positions

All research approaches in social science are based on interconnected sets of assumptions regarding ontology, epistemology, and the nature of society (Morgan & Smircich, 1980, p. 491). Ontology is concerned with assumptions held about whether social reality is regarded as something objective and external to individuals, or whether the social world is subjective and cognitively modelled by social actors. These two different viewpoints are interrelated with epistemological assumptions about what can be seen as adequate knowledge about social reality and how knowledge is acquired and transmitted (Bryman & Bell, 2003, p. 3; Long et al., 2000, p. 195). The three most quoted philosophical positions are positivism, interpretivism, and realism. The positivist approach is derived from the field of natural sciences and is often referred to as one of the most present philosophical stances (Wainwright & Forbes, 2000, p. 261). The positivist’s ontological orientation is based on objectivity. The underlying assumption for positivism is that generalisations can be made in the social world where regularities exist. These generalisations set the base for explanations, which is identical for research in natural sciences (Easton, 2010, p. 120). This worldview encourages the positivist’s epistemological assumption that phenomena existing in the social world should be explained by the same underlying assumptions and by using the same procedures as in natural sciences. Positivist researchers focus on the analysis of precise relationships in an external social world, which is beyond their influence. They believe that knowledge about social reality can only be verified through gathering and rigorous testing of facts (Morgan & Smircich, 1980, p. 492).

In contrast to positivist researchers, interpretivist scientists adapt a subjective ontological worldview where the natural and social sciences are viewed separately (Wainwright & Forbes, 2000, p. 265). Social reality is seen as a continuously changing projection that is created through the imagination and understanding of individuals. This view is often referred to as constructionism (Bryman & Bell, 2003, p. 25). Knowledge is seen as dependent on individuals’ experience (Long et al., 2000, p. 190). The epistemological orientation highlights the importance of understanding the distinctiveness of people and the processes through which they concretise their relationship to the world (Morgan & Smircich, 1980, p. 495). This notion is characterised by the emphasis on understanding and interpreting human behaviour by becoming part of the situation. It is opposed to the positivist approach, which tends to quantify the forces that impact on this behaviour (Long et al., 2000, p. 190).
Realism and in particular critical realism is the third philosophical stance. The thesis on hand is conducted under the epistemological and ontological assumptions of critical realism. Critical realism shares certain features with positivism and interpretivism but also shows some characteristics that the other two approaches fail to reach (Wainwright & Forbes, 2000, p. 272). Critical realists believe that there is an external and objective reality, which is similar to the positivist assumption. However, critical realists disagree with positivists who believe that findings of experiments could be inferred to the reality of the social world. Critical realists argue that these findings were created in an artificially created, closed system without taking into consideration the sequence of events when several mechanisms combine in a non-experimental situation (Bhaskar, 1993, cited in Steinmetz, 1998, p. 176). Thus, critical realists believe that in the social world, as open system, the researcher’s conceptualisation of the reality is only a way of understanding that reality and is not a direct reflection of it (Bryman & Bell, 2003, p. 15). This viewpoint is deemed appropriate for this thesis since the complex structures and relationships of supply chains cannot be viewed in isolation. The epistemological orientation of critical realists focuses on in-depth understanding and causal explanation rather than on describing. Asking for the cause includes questions about what is enabling or what generates a certain condition. Critical realists begin with understanding the subject but then place high significance to the explanation of underlying mechanisms (Easton, 2010, p. 119; Wainwright & Forbes, 2000, p. 270). For this thesis it is of high importance to understand the complex nature of humanitarian supply chains first and then to explore the lean and agile practices that are applied in the separate humanitarian supply chain stages. This approach underlines the appropriateness of critical realism. The critical realist aims at a sound understanding of the underlying structures and relationships of the study subject (Wainwright & Forbes, 2000, p. 262). This is important for this thesis since supply chains are complex systems that require internal and external collaboration between involved parties and thus demand a good understanding of the underlying structures and relationships. The choice of a qualitative research approach for this thesis is in line with the critical realist’s need for in-depth understanding (Lee et al., 1999, p.164). For critical realists, objects, in this case the supply chain of the GRCS, constitute the basis for their explanations. Objects are contrasted by the idea of variables which are mainly used in quantitative analyses. Variables are better in measuring things rather than explaining causes (Easton, 2010, p. 125) which emphasises the adequacy of a qualitative approach for this thesis.

### 3.2 Research Approach

In order to deliver a high quality and reliable study, it is important to identify the relevant approach and strategy for the research to follow (Creswell, 2013, p. 69). The choice and appropriateness of a research approach, whether it is a qualitative or quantitative approach, is typically connected to the underlying epistemological and ontological assumptions of the researcher (Morgan & Smircich, 1980, p. 491). Quantitative research strategies are originally derived from natural sciences and are typically linked to a positivist philosophical position. The underlying assumption is that the social world is characterised by precise structures and can be measured objectively with quantitative data collection methods, such as laboratory experiments or structured interviews (Morgan & Smirchich,
Theory is usually deducted through the testing of hypothesis or propositions (Long et al., 2000, p. 195). The role of the researcher is one of an external observer who is free of interpretations. In contrast, qualitative research can be seen as a research approach which typically addresses the validation or understanding of a new theoretical construct. This type of research is usually linked to the study of phenomena which needs a deeper understanding and explanation and where theory is generated (Edmondson & McManus, 2007, p. 1174). The purpose of this thesis is to identify the applicability of agile and lean practices of commercial supply chains for humanitarian supply chains. In order to serve this purpose a qualitative approach was chosen which emphasises discussions rather than quantifying measures (Bryman & Bell, 2003, p. 25).

Research is typically conducted either to test a theoretical consideration which is called deductive theory or with theory as the outcome of empirical findings which is called inductive theory. For an inductive study, empirical research is undertaken typically by using qualitative research methods such as observations. Qualitative methods and their property of providing detailed information are considered more appropriate since the outcome of inductive studies typically contributes to nascent theories where little previous theory exists (Edmondson & McManus, 2007, p. 1161). Deductive studies build upon existing theories from which hypothesis, propositions, or frameworks are developed which are tested through empirical research. Deductive research is typically conducted by applying quantitative research methods such as surveys. Inductive and deductive studies usually do not occur in a pure form and instead both hold some elements of the other approach. Inductive studies, for example, will in most cases start with some kind of literature review that contributes to the research (Easton, 2010, p. 126). Likewise deductive studies often not only test the hypothesis, frameworks, and propositions but also contribute to theory by relating findings back to the literature, which is a rather inductive element. In many cases research is conducted in iterative circles moving back and forth between data collection and theory (Bryman & Bell, 2003, pp. 10-11). For the purpose of this thesis a deductive study approach is undertaken in combination with a qualitative research approach. The thesis on hand is deductive because the theoretical framework presented in section 2.4 is the outcome of a thorough literature review. The theoretical framework sets the base for the empirical research in this thesis where the applicability of lean and agile practices, as quoted in the framework, shall be tested for the supply chain of one humanitarian organisation. In this thesis, after the data analysis and discussion an adjusted theoretical framework will be presented in section 6.4. The adjusted framework and the findings which are related back to the literature demonstrate an element with inductive tendency. This is in line with the previous proposition that many deductive studies also show some inductive elements.

The following figure provides an outline of this thesis taking into account the main steps of qualitative research.
3.3 Research strategy

Research strategies “are types of qualitative, quantitative, and mixed methods designs or models that provide specific direction in a research design” (Creswell, 2009, p. 11). Creswell (2003, p. 13) introduces five strategies related to the qualitative research approach such as: narrative research, phenomenologies, ethnographies, grounded theory and case studies. Narrative research is suitable to study experiences of individuals, while phenomenological research focuses on common experiences of those individuals – as a phenomena or a concept (Creswell, 2013, p. 76). Ethnography is concerned with studying the entire cultural group and their behaviour, whereas grounded theory aims to build the theory based on the experiences of the large number of individuals involved in the study.
(Creswell, 2013, p. 90). The case study as a research strategy enables the in-depth study and analyses of a single or multiple phenomena known as cases (Creswell, 2013, p. 97).

In order to meet our research objectives the case study strategy was chosen as a research strategy. Case studies are widely used in business and management research (Bryman & Bell, 2011, p. 59; Gummesson, 2007, p. 228; Yin, 2009, p. 2). The approach aims to provide an in-depth analysis of a particular real-life phenomenon which is studied within a particular location or time frame (Creswell, 2013, p. 97; Easton, 2010, p. 118; Piperopoulous, 2010, p. 499; Stake, 1995, p. 2; Yin, 2009, p. 18). The case can be a single organisation, a single location, a person or a single event (Bryman & Bell, 2011, pp. 59-60). Case studies contribute to generating hypotheses (Piperopoulous, 2010, p. 498). Typically, case studies are used for explanatory research with the aim of gaining a rich understanding of a phenomena by asking “why” and “how” questions (Piperopoulous, 2010, p. 498; Saunders et al., 2009, p. 146; Yin, 2009, p. 13). However, the case study strategy is also often used for exploratory topics asking a “what” research question (Yin, 2003, p. 6) where the purpose is to explore a complex phenomenon (Yin, 2003, p. 6) This is the case in the thesis on hand where the supply chain as a complex system consisting of several interconnected processes and networks is investigated. The case study strategy is able to provide contextual analyses and to cope with complexity (Gummesson, 2007, p. 229; Piperopoulous, 2010, p. 498). According to Gummesson (2007, p. 229) “being complex means that multiple factors and relationships are interdependent. Context therefore is a major dimension of complexity”. Case studies provide a holistic insight into a topic, area, problem or situation, as well as vast knowledge about particular aspects (Piperopoulous, 2010, p. 499). Additionally, case studies give the opportunity to investigate ambiguity (Gummesson, 2007, p. 229) and provide flexibility to the research (Easton, 2010, p. 119).

The case study strategy is aligned with the assumptions of critical realism which entails this detailed and intensive research aiming at a deep understanding and explanation of the research topic (Easton, 2010, p. 118). A critical realist case study approach is especially well suited for complex phenomena occurring in organisations or between networks of organisations (Easton, 2010, p. 123). The use of a case study strategy for this thesis is deemed most appropriate since the research objective aims at understanding and exploring the complex networks and processes that are present in supply chains. The study object in this thesis is the supply chain of the GRCS which is analysed in detail by applying a qualitative research approach through semi-structured interviews.

3.3.1 Types of case studies

The literature presents different classifications of case studies. Considering the number of cases involved in the study, the research can explore a single case or multiple cases (Creswell, 2013, p. 97). Stake (1995, p. 3) presents intrinsic and instrumental natures of case studies based on the intent of the research. Intrinsic cases are mostly concerned with providing detailed description and insight of a unique, rare case, while instrumental cases focus on understanding a particular problem or concern around the phenomena. The case or cases are selected accordingly to obtain the general insight of the question. Additionally, Yin (2009) distinguishes holistic and embedded cases based on the units of analysis. The holistic case study aims to investigate the entire case as a whole, whereas embedded cases
focus on analysing part of it involving logical sub-units of the case considering the purpose of the research. This thesis explores the supply chain practices of the GRCS during the armed conflict in 2008 which represents a sub-unit of the case and explains the embedded nature of the case study. Figure 5 illustrates the different characteristics of case studies where the ones applied in this thesis are highlighted in green.

![Figure 5: Characteristics of case studies](image)

While selecting the case we followed the key criterion – to choose a case which will generate the maximum learning (Stake, 1995, p. 4). In order to produce the in-depth understanding of the problem our study is based on a single case – demonstrating the instrumental and embedded nature by looking at the particular sub-units within the organisation. Thus, the GRCS was selected as a case. For detailed reasoning please see section 4.2.1.

### 3.3.2 Limitations of case studies

Case studies have been criticised for several reasons. One major criticism is that case studies are said to lack rigour which could lead to biased findings (Bryman & Bell, 2003, p. 55). However, Yin (2009, p. 14) claims that the lack of rigour is often caused by researchers who do not follow systematic procedures or who are influenced by ambiguous or biased findings which impact the results. Compared to other research strategies, there are only few textbooks supporting researchers with systematic procedures for case studies (Yin, 2003, p. 10). However, in order to anticipate the possibility of a lack of rigour through biased or ambiguous results, the researchers of this thesis analysed the data separately in order to compare and discuss the results. Additionally, the analysis was sent to the interviewees to ensure that there were no misunderstandings. Eisenhardt and Graebner (2007, p. 28) provide the argument for bias reduction by gathering data from different people’s perspective about one and the same phenomena. In this case the different sources of information can vary among different hierarchical positions in the organisation, groups of people, geographical locations, or functional areas. To capture the different viewpoints of the humanitarian supply chain and to reduce bias, employees of diverse organisational hierarchies from the GRCS were interviewed in our case study.
Another major criticism of case studies is their lack of external validity or generalisation (Gummesson, 2007, p. 228; Easton, 2010, p. 126; Eisenhardt & Graebner, 2007, p. 26; Lukka & Kasanen, 1995, p. 71; Yin, 2009, p. 15). In many studies research is based on single cases. This arouses doubts about the result’s applicability to other cases (Easton, 2010, p. 126; Lukka & Kasanen, 1995, p. 71). Those critics often misleadingly assume that a case study represents a sample of one which would enable researchers to draw conclusions for entire populations (Bryman & Bell, 2003, p. 55). Some researchers claim that case study results could be generalised to other cases if the study is conducted correctly and a representative case is selected (Lukka and Kasanen, 1995, p. 77). This claim is based on a proper analysis of the case problem which would support the idea of applicability of findings to other cases (Lukka & Kasanen, 1995, p. 85). However, Yin (2003, p. 10) questions this generalisation due to the difficulty of finding a “representative” case and the vast differences that every case will hold. Instead, this author emphasises that researchers using case studies should aim at generalising and expanding theories and not enumerating frequencies. This is referred to as analytic or theoretical generalisations (Bryman & Bell, 2003, p. 55; Yin, 2003, p. 10). For this type of generalisation it is assumed that a certain theory underlies and motivates each case study. The empirical findings of the case study, in turn, are connected with and contribute to this theory. However, a strong support of theories requires replication of findings through additional case studies (Yin, 2003, p. 37). This thesis was motivated by existing literature in commercial and humanitarian supply chain. The previously developed theoretical framework shall serve as the basis of the empirical research and its findings shall be linked to existing research in humanitarian supply chain management.

Qualitative researchers additionally criticise case studies for being useful at the exploratory stage demonstrating the conceptual nature but not delivering tangible findings (Gummesson, 2007, p. 228). Case studies have also been judged for requiring too much time and delivering immense documents, which are difficult to read (Yin, 2009, p. 15). The case study as a strategy is widely used and promoted by literature (Lukka & Kasanen, 1995, p. 76; Saunders et al., 2009, p. 147).
4 Research Design

This section discusses the literature selection process and provides the background of the chosen case organisation and the event. Further, the research method, data-collection method and the interview proceeding are explained. Additionally at the end of the section the criteria for the qualitative research assessment and ethical considerations will be discussed.

4.1 The literature selection process

In order to find the most relevant articles for this topic, the search was limited to academic peer reviewed journals considering their academic relevance. The following five steps on the basis of Webster & Watson (2002, p. 16) were undertaken for a structured approach to the literature search:

1. **Keywords search in several journal databases**, such as Business Source Premier, Emerald, Sage Journals, Science Direct, Wiley, accessed through Umeå University and Heriot-Watt University library services. The keywords included: “Supply chain”, “Commercial supply chain”, “Lean and agile principles”, “Agile supply chain”, “Lean supply chain”, “Flexibility in supply chains”, “Effectiveness and efficiency in supply chain”, “humanitarian logistics”, “humanitarian supply chain”, “humanitarian aid”, “disaster operations”, “emergency operations”, “emergency logistics”, and “relief operations” in combination with “lean”, “agile”, and “le-agile”. The content was first filtered based on title, abstract, and keywords. The search was limited to publications after 1980 were the first works on disaster operations management were published (Leiras et al., 2014).


3. **By reviewing the reference list of the key articles** identified in the previous steps, the search for important articles was extended in a backwards looking way.

4. **By reviewing articles that were citing the key articles** identified in the previous steps to include more recent publications in the search.

5. **Reviewing recommended articles which were related to the topic** as “Users who downloaded this article also downloaded” suggestion.

4.2 Data Collection

For the data collection the GRCS was selected as case organisation. The choice of this case as well as the selection of the armed conflict in 2008 as a focus of the study will be explained and reasoned in the following sub-sections.
4.2.1 Case Selection

The literature distinguishes between natural and man-made disasters. Natural disasters can be further classified as being “slow-onset”, such as poverty or drought, or “sudden-onset” such as earthquakes or hurricanes. Likewise man-made disasters can be “sudden-onset”, such as terrorist attacks or “slow-onset”, such as political or refugee crisis (Van Wassenhove, 2006, p. 476). According to Leiras et al. (2014, pp. 108-109) previous research mainly focused on sudden-onset disasters with less attention on man-made slow-onset disasters. This gap provided the reason for choosing the event of the armed conflict in August 2008 as a research focus where the GRCS was heavily involved. The reason for the low attention for these types of disasters is assumed to be their high level of complexity and difficulty to access. Armed conflicts are often viewed as a separate category alongside natural and man-made disasters with the assumption that most humanitarian aid organisations do not get involved during the active fights (Van Wassenhove, 2006, p. 476). However, Leiras et al. (2014, p. 1) consider conflicts and armed conflicts as parts of man-made disasters. According to The UN Refugee Agency (UNHCR, 2008, p. 3) during the Georgian-Russian armed conflict, humanitarian organisations were already activated on the first day after the conflict escalated which contradicts the previous assumptions that armed conflicts should be regarded as a separate category of disasters and supports Leiras et al.’s (2014) viewpoint to see them as man-made disasters.

The previous explanations of disaster types and the gap in existing research build the basis for the selection of the case. The GRCS as part of the globally acting IFRC was selected to gain a deep understanding of the research problem – identification of lean and agile commercial supply chain practices that are applied for humanitarian supply chains. Due to the general respectability and capacity of Red Cross organisations, the GRCS was selected as a case in order to ensure obtaining high quality and reliable data to generate the maximum knowledge (Stake, 1995, p. 4). In order to explore the case in-depth, the researchers focused on the specific situation and event in a particular time frame (Creswell, 2013, p. 99), namely the Georgia-Russia armed conflict in 2008. Table 1 summarises the empirical focus of this thesis.

<table>
<thead>
<tr>
<th>Empirical focus</th>
<th>Georgia Red Cross Society</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Case</td>
<td>Georgia Red Cross Society</td>
</tr>
<tr>
<td>Location</td>
<td>Georgia</td>
</tr>
<tr>
<td>Particular event</td>
<td>2008 armed conflict</td>
</tr>
</tbody>
</table>

Table 7: Details of the empirical study

4.2.2 Background of the armed conflict

Georgia is located in the Caucasus region and represents a crossroad between Eastern Europe and Western Asia. The borders of the country are as follows: the Black Sea to the west, Russia to the north, Azerbaijan to the southeast, Armenia and Turkey to the south. Georgia had been facing conflicts with Russia about two Georgian regions: Abkhazia and South Ossetia (Georgian historical name – Samachablo), which represent the de facto authorities since 1992-1993. Russia has demonstrated the support to the de facto
administration by placing “peacekeeping” military forces on the territory, as well as issuing Russian passports in the territory of Abkhazia and South Ossetia. This process provides the basis for the Russian claim that military action against Georgia was necessary in order to protect “Russian citizens” (AI, 2008, p. 7). Political tensions between Georgia and Russia expanded into an armed conflict on August 8th, 2008. The armed conflict significantly affected the infrastructure and large numbers of people. As a result around 192,000 people were forced to be displaced, whereas 31,000 people remained as “permanently unable to return to their original place of residence” - appearing in an extreme need of immediate humanitarian aid (Van den Brande & Eörsi, 2008). As the damages and the number of people affected by the 2008 armed conflict were the biggest since the first incidents in the 1990s in Georgia, the humanitarian organisations faced a number of challenges, as undertaking different actions simultaneously was crucial (UNHCR, 2008). The study of the humanitarian supply chain based on this event was found as the best for obtaining the maximum knowledge and understanding around the phenomena (Stake, 1995, p.4) which is the major criterion for the case selection.

4.2.3 Georgia Red Cross Society

The GRCS was established in 1918 and since then has been carrying out its activities under its mission, vision, and statutory objectives based on the GRCS Statutes, as well as strategic and operational plans. GRCS represents the only humanitarian organisation operating according to the “Law on Use and Protection of Red Cross Emblem and Name”, the “Law on the Georgia Red Cross Society” and the GRCS Statutes. GRCS delivers various humanitarian services in Georgia in the following core areas such as health and care, disaster management, youth and volunteer development, fundamental principles and humanitarian values. Additionally it is the member of the Harm Reduction National Network (HRNN) (GRCS, 2014). The organisation was directly involved in humanitarian processes related to the armed conflict in 2008. The GRCS represents the only non-state organisation, which has been given the explicit role in the State National Response Plan on Natural and Man-made Emergency Situations based on the Presidential Decree #415 issued in August 26, 2008. The GRCS participates in search and rescue activities in the zones of emergencies; under the coordination of the Emergency Management Department of the Ministry of Internal Affairs of Georgia, coordinates the activities of non-governmental organizations involved in emergencies results liquidation activities. The GRCS is auxiliary body to the Ministry of Labor, Health and Social Affairs of Georgia in provision of primary medical care for injured and arranges field hospitals. Additionally, the GRCS is auxiliary to the Ministry of Agriculture of Georgia in provision of food and water during emergencies (GRCS, 2014). The GRCS together with other 188 countries’ National Societies – represents a part of the International Red Cross and Red Crescent Movement, the GRCS shares and conducts its activities under seven Fundamental Principles such as: humanity, impartiality, neutrality, independence, voluntary service, unity and universality (ICRC, 2013). Figure 7 illustrates the components and bodies of the International Red Cross and Red Crescent Movement.
Within the organisation we had two contact persons who assisted in organising the data collection process. Initially we sent an e-mail to the GRCS providing the information about the research, its objectives and requirements for the data. Our contact persons communicated the details to the president and the Secretary General of the organisation for efficient planning of the data collection process including the selection of competent respondents. The list of interviewees was prepared based on the criteria provided by us:

1. The respondents should represent the different position within the organisation to mitigate the bias of the information;
2. All the respondents had to be involved in humanitarian activities related to the 2008 armed conflict;
3. All the respondents need to be able to communicate in English.

As a result six employees were selected to participate in our research. Details about the interviewees are provided in the following table.

<table>
<thead>
<tr>
<th>Interviewee Number</th>
<th>Years of Experience</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15</td>
<td>Deputy Secretary General</td>
</tr>
<tr>
<td>2</td>
<td>19</td>
<td>Head of the Logistics Department</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>Disaster Management Coordinator</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>Resource Mobilisation Department Representative</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>Deputy Secretary General</td>
</tr>
<tr>
<td>6</td>
<td>16</td>
<td>Deputy Secretary General</td>
</tr>
</tbody>
</table>

Table 8: Selected respondents

Two respondents did not speak English, however participations of both of them in the research was crucial as they possessed the key information about the research topic and the event. These respondents were the head of the Logistics Department and the representative of the Resource Mobilisation unit, which was formed as a result of the armed conflict and
represented one of the key units during the preparedness phase after the event. Considering this the researchers found extremely important to include the person in the study and investigate the function. Based on this, the interviews were conducted in Georgian by one of the researchers who spoke the language, which have been translated into English. The English translation was additionally sent to the third party for checking and approval of the translation accuracy from Georgian into English. Further to the interviews we asked our contact persons for sharing other relevant documentation related to the topic, however due to confidentiality purposes the request was not supported.

4.3 Semi-structured interviews

The literature suggests a number of data collection methods that can be used while conducting case studies, such as observations, documentation, archival records, physical artefacts, illustrative materials, survey data, and ethnographies (Eisenhardt & Graebner, 2007, p. 28; Yin, 1981, p. 104). Participant observations are often used for qualitative research since the researcher becomes part of the social life of the people and relationships under study. Participants can be studied in their everyday environment which allows insights that might not be given during the situation of a pre-planned interview. As a downside, participant observations are very time consuming and cannot be undertaken in every context (Creswell, 2003, p.134; Yin, 2003, p. 86). As the event that has been studied for this thesis took place in 2008 and due to the geographical distance between the researchers and the study organization, no observations were possible to conduct. Likewise documents as a source of data could not be analysed as the request for providing relevant documentation and archival data to the researchers has been rejected by the case organization due to confidentiality reasons.

In order to obtain the in-depth understanding of the phenomena, interviews were chosen for obtaining the data. Interviews are seen as a key source of information and essential for case study research (Yin, 2009, p. 106). It provides the opportunity to directly address the case study topic, as well as to capture the insight and causal explanations for the phenomena (Saunders et al., 2009, p. 318; Yin, 2009, p. 104). Based on the structure and the level of formality interviews are categorised into structured, semi-structured, and unstructured/in-depth interviews (Saunders et al., 2012, p. 374). For our research purposes semi-structured interviews were chosen, as research method, which represents a relevant tool to examine the social world and the interaction between individuals as interpreted by its participants (Bryman & Bell, 2003, p. 280). It is suitable for exploratory research and case studies (Bryman & Bell, 2011, p. 473; Saunders et al., 2012, p. 377). Semi-structured interviews are characterised by having a list of areas and key questions to be addressed, providing the researchers a flexibility to vary their use among different respondents. It gives the possibility to ask additional questions or clarifications in order to ensure the in-depth understanding of the topic. The use of audio recording is also widely introduced during the data capturing (Saunders et al., 2012, pp. 374-375).

In order to obtain the data from the respondents, twelve questions were formulated in our semi-structured interview guide covering the themes presented in the theoretical framework. The interview guide can be found in Appendix 1. The order of the questions
asked varied based on the roles of the interviewees. The need and content of additional questions also differed based on the information obtained.

4.3.1 Interviewing Proceeding

Due to the geographical limitations - as the researchers were located in Umeå, Sweden and the respondents were based in Tbilisi, Georgia - Skype was chosen as a tool for conducting interviews. The interviewing times varied between 20 and 52 minutes. Voice recording technical tools were used to record interviews which were transcribed afterwards. Both researchers were equally involved in the interviewing process of the four English speaking respondents – each of them asking questions from the interview guide. As for the Georgian speaking respondents – the Georgian speaking researcher led the interviewing process, fully covering all the questions from the interview guide. The data obtained in Georgian, was translated into English. The accuracy of the translation was additionally checked and approved by the third party.

4.4 Criteria for qualitative research

In order to assess the quality of the qualitative research the literature refers to certain criteria. Some researchers believe that the qualitative research can be judged by adapting reliability and validity criteria from the quantitative research as summarised in Table 3 (Bryman & Bell, 2011, p. 395).

<table>
<thead>
<tr>
<th>Reliability</th>
<th></th>
<th>Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>External</td>
<td></td>
<td>External</td>
</tr>
<tr>
<td>“The degree to which the study can be replicated”.</td>
<td>Extend to what “the members of the research team agree on what they see and hear”.</td>
<td>“The degree to which findings can be generalized across social settings”.</td>
</tr>
<tr>
<td>Internal</td>
<td></td>
<td>Internal</td>
</tr>
<tr>
<td>“Whether or not there is a good match between researchers’ observations and the theoretical ideas they develop”.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 9: Reliability and validity criteria

However Guba and Lincoln (1994) introduce other criteria such as trustworthiness and authenticity as alternatives to reliability and validity. Trustworthiness contains four sub-criteria (Bryman & Bell, 2011, p. 395), whereas authenticity consists of five sub-criteria (Bryman & Bell, 2011, p. 398) as can be seen in Table 4.
Table 10: Trustworthiness and authenticity criteria

<table>
<thead>
<tr>
<th>Trustworthiness</th>
<th>Authenticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Credibility</td>
<td>1. Fairness</td>
</tr>
<tr>
<td>2. Transferability</td>
<td>2. Ontological Authenticity</td>
</tr>
<tr>
<td>3. Dependability</td>
<td>3. Educative Authenticity</td>
</tr>
<tr>
<td></td>
<td>5. Tactical Authenticity</td>
</tr>
</tbody>
</table>

(1) **Credibility/Internal validity**

This criterion is responsible to determining the sensible link between the research itself and the ideas resulted from the research findings. It requires the in-depth understanding of the phenomena by researchers that must be confirmed by the members who were studied (Bryman & Bell, 2011, p. 396). In our case the research was based on the in-depth analysis of existing literature, providing the detailed description of the topic and problem. The data analysis part was sent to the GRCS for confirming the researchers’ proper understanding of the phenomena, which additionally increases the credibility of the current research findings.

(2) **Transferability/External validity**

One of the key criteria for judging qualitative research is its ability to provide transferable and generalizable findings (Bryman & Bell, 2011, p. 398). As indicated in section 3.2.2, the aim of this study is not to generalise the findings to other cases but instead to contribute with the research’s findings to existing theory in the form of analytic generalisation.

(3) **Dependability/Reliability/Replicability**

Dependability and reliability (internal and external) criteria measure the stability and consistent nature of findings over time. It obliges researchers to develop an “auditing” approach by ensuring the complete record keeping during the entire research. This builds trustworthiness by providing the possibility to access the data easily (Bryman & Bell, 2011, p. 398). Replicability is closely related to the internal reliability criterion. It tests the extent to which a study can be repeated (Bryman & Bell, 2011, p. 573). The fact that two researchers were participating in the study mitigates bias of the outcome of the study and increases the reliability of our results. Both of us were equally involved in the research reaching common agreement and understanding of the data and findings which contributes to internal reliability. Four interviews were conducted in English which raised the risk of misunderstanding questions by interviewees, however the additional clarifications were provided in Georgian language as one of the researchers is Georgian. Two interviews were carried out in Georgian language eliminating the language barriers and misunderstanding of questions between the respondents and the researcher. The data obtained in Georgian was translated into English and the accuracy was approved by a third party accordingly. The interview guide that was used during the Skype interviews is attached in Appendix 1 of this thesis. All interviews were recorded and transcribed. The recordings and transcripts were saved with a file hosting service to prevent their loss. This shall support the reliability of the empirical findings and also support other researchers who wish to repeat or replicate the research. However, special attention would have to be paid to the individual context of each case study.
(4) Confirmability/Objectivity

The confirmability criterion stands for reasonable objectivity. The literature recognises the difficulty to achieve absolute objectivity in the research, however the researchers are required to stay reasonably neutral and “act in a good faith” (Bryman & Bell, 2011, p. 398). During the research we directed our attention to get familiar with the topic by studying carefully the existing literature. Considering differences in our nationalities (German and Georgian) we dedicated our time to achieve the equal understanding of Georgian cultural diversities. Both of us demonstrated neutral attitude during the interviewing processes. The fact that one of the researchers is Georgian increased the risk of bias due to sensitivity and emotional bounding towards the event, however presence of the German nationality researcher in our study reasonably mitigated this risk.

(5) Authenticity

The authenticity criterion is concerned with the political impact that the research can have. It refers to investigations of the topic from different perspectives of the studied social entity members (Bryman & Bell, 2011, p. 398). It measures the research’s ability to bring the members to a better understanding of the topic, to motivate them to take actions, and to implement changes (Bryman & Bell, 2011, p. 399). The criterion was met reasonably by interviewing people from different organisational positions. This contributed to in-depth understanding of the phenomena and decreased the risk of obtaining a subjective assessment of the respondents.

4.5 Ethical considerations

The literature raises awareness about ethical issues that might be present at various stages of the research. These issues cannot be left without attention as they account for integrity between the research and disciplines that are engaged in the research (Bryman & Bell, 2007, p. 127). Diener and Crandal (1978, cited in Bryman & Bell, 2007, p. 132) represent four ethical principles to be taken into consideration. These are harm to participants, lack of informed consent, invasion of privacy, and deception. The avoidance of harm to participants obliges the researchers to evaluate the potential risks of harm to respondents and to minimise the occurrence of it. Harm can be identified as physical harm, stress, and harm to self-esteem of participants, as well as harm to career possibilities. This principle is also related with confidentiality and anonymity (Bryman & Bell, 2007, p. 133). The lack of informed consent obliges researchers to provide the participants with as much information as they need in order to make a decision about their participation in the research (Bryman & Bell, 2007, p. 137). Invasion of privacy is linked with the principle of lack of informed consent. It measures the degree to which privacy invasions are allowed (Bryman & Bell, 2007, p. 139). The principle deception takes place when the researchers try to present the research as something other than it actually is (Bryman & Bell, 2007, p. 141). To avoid the harm of the present research participants, detailed information about the research and its objectives were sent in advance to the interviewees. All of them were informed and assured that the data would be confidential and wouldn’t be used for any other purposes than the current research. Additionally we kept all interviewees anonymous, although none of them
saw the problem in publishing their names. The interviews were recorded only after receiving permissions for it from all respondents prior to the Skype interviews. In order to avoid a lack of informed consent and deception, the interviewees were provided with the interview guide and detailed information about the study objectives through the contact persons in advance.

Additionally the literature stresses the importance to meet other ethical principles such as: data protection, reciprocity and trust between researchers and participants, and affiliation and conflicts of interest (Bryman & Bell, 2007, p. 143). As the interviews in the current research were conducted through Skype, respondents were not able to meet the researchers in person. This could have influenced the respondents trust towards the researchers. However, the risk of trust issues was reasonably mitigated by introducing ourselves openly, in detail to the interviewees, by ensuring our willingness to provide any required information about the study, and by expressing our ambition to answer any occurring questions. The interviewing process was held through voice calls, which did not give us the opportunity to observe the behaviour and reactions of the respondents. However, the researchers paid attention to the sounds and voices of the interviewees which provided insights about their hesitations and confidence. In the current research all the literature sources and data used were cited accordingly in order to avoid plagiarism. No additional ethical issues to be addressed have occurred during the study.
5 Data Analysis

In the section the data collected from the interviews will be analysed and displayed. Additionally, the underlying data analysis strategy and technique will be justified.

5.1 Data analysis strategy

One of the main challenges of the qualitative research is typically the large amount of unstructured text in the form of interview transcripts or documents. It is the researcher’s responsibility to define the most appropriate strategy and to use the best technique for analysing the data in order to extract all relevant information (Bryman & Bell, 2003, p. 425). Yin (2003, p. 109) suggests three strategies for analysing case study data. These are “considering rival explanations”, “preparing case descriptions”, and “leaning on theoretical propositions”. Defining a strategy before the data is analysed is important in order to know the direction of the analysis and to know what to look for (Yin, 2003, p. 110). The first analytic strategy “thinking about rival explanations” is mainly directed at case studies where the research topic and the outcome of an observation may be subject to the influence of several factors. The second analytical strategy “preparing a case description” is less favoured than one of the other two strategies but might be used if the rival explanations or theoretical propositions approach cannot be applied (Yin, 2003, p. 114). For the analysis of the data in this thesis the third and the most applied strategy – “relying on theoretical propositions” – was chosen. Within this strategy it is assumed that the research question and the research objectives were based on theoretical propositions in existing literature. These propositions could then be used to develop a framework which facilitates in the organisation and analysis of the data (Yin, 2003, p. 112). The theoretical propositions that direct the analysis in this thesis are based on the theoretical framework which was introduced in section 2.4. This theory based data analysis approach is in line with Saunders et al.’s (2012, p. 556) suggestion that qualitative data may be analysed by using a conceptual framework which can be developed and improved before, during or after the data collection process. One advantage of starting the research within a theoretical context is that the outcome will directly be embedded in an existing body of knowledge in the research field. However, this strategy has also been criticised for being very predetermined due to its reliance on a pre-built framework and thus, possibly overlooking emerging aspects of the topic under investigation (Bryman, 1988, cited in Saunders et al, 2012, p. 547). To precede this issue Saunders et al. (2012, p. 548) suggest to incorporate an inductive approach in the research. In order to follow this suggestion in the thesis on hand, a question has been included in the interview guide which aims to find out about any practices which were not included in the theoretical framework introduced in section 2.4.

After choosing an analytic strategy, an appropriate tool or technique for analysing the data needs to be selected which should match with the deductive nature of the research (Saunders et al., 2012, p. 557). Most data analysis techniques use coding for structuring the data from different transcripts (Bryman & Bell, 2003, p. 424).
5.2 Template analysis technique

The overall analysis of the data in the thesis on hand is based on the technique of Template Analysis which starts from a deductive perspective. The advantage of Template Analysis is that it also allows inductive elements. This is helpful to overcome the before mentioned criticism of basing the data analysis on theoretical propositions. Template Analysis uses predetermined codes or categories that are usually based on a previous literature review. The collected data is further attached in units to these codes. Units of data can be single words, whole sentences, several sentences or paragraphs (Saunders et al., 2012, p. 558). The Template Analysis technique is in line with the deductive nature of this thesis. The codes, which were identified for this research, are according to the theoretical framework developed in section 2.4. Template Analysis also allows relevant codes which were identified during the process of analysing to be included or redundant codes to be removed. This can be considered as an inductive element and is in line with the attempt to include additional lean and agile practices in humanitarian supply chains which might have been mentioned by interviewees. Template Analysis allows a hierarchical display of the identified categories or codes (King, 2012, cited in Saunders et al., 2012, pp. 572-573). This is supportive for the theoretical framework of this thesis since in this framework it is assumed that the identified practises that shall be tested during the interviews are needed to fulfil the lean and agile requirements – on the next level – which in turn are required for achieving the higher level lean and agile characteristics. These characteristics have been identified in the literature as most relevant to increase the efficiency and effectiveness of supply chains. According to the theoretical framework, the initial template, illustrated in Table 11, is divided into preparedness, response, and reconstruction stages. The highest level of codes is composed of the lean and agile requirements presented in the framework. These are “network building”, “proper inventory management”, “identification of product losses”, “accurate demand management”, and “knowledge management” in the preparedness and reconstruction stages, where a lean strategy is assumed to be applied best. In the response phase, these requirements for agile characteristics are “network building”, “market/customer sensitivity”, “process alignment”, and “virtuality”. Each requirement code holds one or two sub-codes that represent the practices to be tested with the interviews. After the interviews were conducted and the data analysed using the initial coding table, the need for several adjustments was identified. The following table shows the initial coding table. Codes that were identified to be redundant have been struck out already.
The revised coding table includes added codes that can be identified through their italic formatting. After an initial analysis of the interviews, a need for additional codes was revealed in order to analyse and further discuss the findings in the most appropriate manner. In the preparedness stage the requirement of “network building” was further divided into networks with a separate focus on donors, suppliers, volunteers, governments, and other non-governmental organisations (NGOs). Trainings/lessons learned within “Knowledge management” were divided into two separate sub-categories. This separation was deemed necessary due to the importance that was placed on these parties by the interview respondents. In the response stage for the requirement of “network building”,

<table>
<thead>
<tr>
<th></th>
<th>Preparedness</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><a href="#"><strong>Preparedness</strong></a></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Network building</td>
<td>PRE-NET</td>
</tr>
<tr>
<td>1.1.1</td>
<td>Suppliers</td>
<td>PRE-NET-SUP</td>
</tr>
<tr>
<td>1.2</td>
<td>Proper inventory management</td>
<td>PRE-INM</td>
</tr>
<tr>
<td>1.2.1</td>
<td>Pre-positioning</td>
<td>PRE-INM-PRP</td>
</tr>
<tr>
<td>1.2.2</td>
<td>Inventory reporting system</td>
<td>PRE-INM-IRS</td>
</tr>
<tr>
<td>1.3</td>
<td>Identification of product losses</td>
<td>PRE-PLS</td>
</tr>
<tr>
<td>1.3.1</td>
<td>Inventory reporting system</td>
<td>PRE-PLS-IRS</td>
</tr>
<tr>
<td>1.4</td>
<td>Accurate demand management</td>
<td>PRE-ADM</td>
</tr>
<tr>
<td>1.4.1</td>
<td>Needs assessment</td>
<td>PRE-DEM-NAS</td>
</tr>
<tr>
<td>1.5</td>
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<td>PRE-KNM</td>
</tr>
<tr>
<td>1.5.1</td>
<td>Trainings/lessons learned</td>
<td>PRE-KNM-TRA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Response</th>
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<td>2</td>
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<td>2.1</td>
<td>Network building</td>
<td>RES-NET</td>
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</tr>
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<td>Market/customer sensitivity</td>
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<td>Needs assessment</td>
<td>RES-PRI</td>
</tr>
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<td>Process integration</td>
<td>RES-PRI-APR</td>
</tr>
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<td>RES-VIR</td>
</tr>
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<td>RES-VIR-CIE</td>
</tr>
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</table>

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td><a href="#"><strong>Reconstruction</strong></a></td>
<td></td>
</tr>
<tr>
<td>3.1</td>
<td>Network building</td>
<td>REC-NET</td>
</tr>
<tr>
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<td>Supplier</td>
<td>REC-NET-SUI</td>
</tr>
<tr>
<td>3.2</td>
<td>Proper inventory management</td>
<td>REC-INM</td>
</tr>
<tr>
<td>3.2.1</td>
<td>Pre-positioning</td>
<td>REC-INM-PRP</td>
</tr>
<tr>
<td>3.2.2</td>
<td>Inventory reporting system</td>
<td>REC-INM-IRS</td>
</tr>
<tr>
<td>3.3</td>
<td>Identification of product losses</td>
<td>REC-PLS</td>
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<td>Inventory reporting system</td>
<td>REC-PLS-IRS</td>
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<td>Accurate demand management</td>
<td>REC-ADM</td>
</tr>
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<td>Needs assessment</td>
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</tr>
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<td>Knowledge management</td>
<td>PRE-KNM</td>
</tr>
<tr>
<td>3.5.1</td>
<td>Trainings/lessons learned</td>
<td>PRE-KNM-TRA</td>
</tr>
</tbody>
</table>

**Table 11: Initial coding table for data analysis**
codes for partnerships and volunteers were added. In the reconstruction stage the code for collaborative relationships was added to the requirement “network building”.

<table>
<thead>
<tr>
<th>1</th>
<th>Preparedness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Network building</td>
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<tr>
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<td>Donors</td>
</tr>
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<td>Suppliers</td>
</tr>
<tr>
<td>1.1.3</td>
<td>Volunteers</td>
</tr>
<tr>
<td>1.1.4</td>
<td>Governments</td>
</tr>
<tr>
<td>1.1.5</td>
<td>Other NGOs</td>
</tr>
<tr>
<td>1.2</td>
<td>Proper inventory management</td>
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<tr>
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<td>Pre-positioning</td>
</tr>
<tr>
<td>1.2.2</td>
<td>Inventory reporting system</td>
</tr>
<tr>
<td>1.3</td>
<td>Identification of product losses</td>
</tr>
<tr>
<td>1.3.1</td>
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</tr>
<tr>
<td>1.4</td>
<td>Accurate demand management</td>
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<tr>
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<td>1.5</td>
<td>Knowledge management</td>
</tr>
<tr>
<td>1.5.1</td>
<td>Trainings</td>
</tr>
<tr>
<td>1.5.2</td>
<td>Lessons learned</td>
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</table>

<table>
<thead>
<tr>
<th>2</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>2.1.1</td>
<td>Collaborative relationships</td>
</tr>
<tr>
<td>2.1.2</td>
<td>Partnerships</td>
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<td>2.1.3</td>
<td>Volunteers</td>
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<td>Market/customer sensitivity</td>
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<td>Process integration</td>
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<td>Aligned processes</td>
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<td>Virtuality</td>
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<td>Continuous information exchange</td>
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</table>

<table>
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<th>3</th>
<th>Reconstruction</th>
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<tbody>
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<tr>
<td>3.4.1</td>
<td>Needs assessment</td>
</tr>
</tbody>
</table>

Table 12: Adjusted coding table for data analysis
5.3 Analysis of interview results

For the display and analysis of the interview transcripts which aim at testing and exploring the lean and agile practices, a matrix structure was selected as suggested by Miles & Huberman (1994, p. 175). Matrices, in the form of tables, group information in cells under defined rows and columns. The large amount of data is further reduced and summarised according to the rows and columns. This approach allows a clearer arrangement of data and facilitates the subsequent analysis. For the analysis of the lean and agile practices in this thesis, the interviewees are represented with numbers in the columns of each table. The numbers are corresponding with Table 8 that lists the selected respondents. The rows show the lean and agile practices identified in the theoretical framework. Since the combination of humanitarian supply chain stages and lean and agile strategies are considered, there is a separate matrix for the preparedness, the response, and the reconstruction phases. The crosses in the cells indicate if the respondents mentioned the certain practice.

Preparedness Phase

<table>
<thead>
<tr>
<th>Code</th>
<th>Respondent</th>
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<th>3</th>
<th>4</th>
<th>5</th>
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<td></td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>PRE-NET-SUP</td>
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<td></td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
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<td>x</td>
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Table 13: Preparedness stage - code and respondent matrix

This thesis particularly examines the supply chain practices of the case organisation during the armed conflict in August 2008. For this purpose, the researchers explored the whole lifecycle of the humanitarian response process – preparedness, response, and reconstruction stages. Additionally the current preparedness phase, which emerged after the event, has been analysed. The analysis of the new preparedness phase was very important since many supply chain improvements resulted from learnings of the armed conflict in 2008. A consideration of this new preparedness stage is desirable for the findings of this study since the interviewees of the GRCS ensured that generally, in their case, the same supply chain practices are used for any other kind of disasters.
Most of the respondents stressed the importance of the network building among different organisations and individuals for the preparedness stage prior to the conflict. The mostly revealed targets for network building were donors, the local corporate sector, suppliers, volunteers, local NGOs, and the governmental bodies. The strongest network that already existed prior to the armed conflict in 2008 was the network consisting of the 189 Red Cross National Societies. This network was mentioned by all interviewees as the part of the preparedness phase before the conflict event. Under the umbrella principle of Universality of the Movement, all of the 189 National Societies depending on their capacities supported the country appearing in a need of urgent assistance. Based on respondent 4 “we [the National Societies] are a huge strength and power for each other whenever the disaster or the catastrophe happens”. Interviewee 1 supports this by saying that “this is the type of partnership, which is very well coordinated” and it represents a very important part of the network building. As it has already mentioned, this relationship among the National Societies existed before the conflict; however after the conflict, as part of the new preparedness phase, the focus on enhanced collaboration among them has increased. Nowadays, the cooperation between National Societies is additionally supported by the IFRC to enrich their abilities during the disaster preparedness. Respondent 4 also mentioned the recent decision to conduct regular conferences among National Societies in order to share experiences, strengthen each other and improve performances. Based on interviewee 3 the collaborative relationships support implementing joint projects that aim at the better preparedness for all National Societies. According to interviewee 5, “the ICRC within an emergency preparedness project called harmonised operational programme (HOP) – [implemented after the conflict] provided us with several four-wheel cars. It was a support programme to be better prepared for the future if emergencies occur.”

The importance of international donors as well as local donors in network building for the preparedness phase was mentioned by four respondents. During the preparedness phase prior to the conflict, a number of projects were implemented sponsored by donors. However, after the conflict, even more attention is paid to building relationships with them. Interviewee 6 states: “As we are not a rich country and the private society is not that strong, we mostly rely on donors, however we focus on enhancing partnerships with private companies as well”. Interviewee 1 explains: “We pay a lot of attention to strong partnerships with local donors; we know that the external donors cannot stay with the organisation forever; that is why we additionally focus on local donors”.

The research identified that the collaborative activities between the governmental bodies and the GRCS played an important role during the armed conflict. During the preparedness phase, prior to the conflict, the GRCS had signed the “memorandums of understanding” with local municipalities about joint activities in case of emergencies. According to this memorandum the local governmental bodies provided the GRCS with facilities and assisted in the distribution of goods during the conflict and also other emergency events. This had collaboratively increased the effectiveness of the response phase. After the conflict, the partnership between the GRCS and the Government of Georgia strengthened even more due to new specific functions of the GRCS stipulated by the presidential decree N 415. In scopes of the mentioned decree, the GRCS on the one hand became the partner of the government of Georgia. On the other hand the GRCS now coordinates activities of all NGOs during emergencies. According to respondent 6 this is indicated by joint activities
with these NGOs and an increased communication through information sharing, discussions, and reports about implemented activities. During peace time regular quarterly meetings are organised where all NGOs operating in the humanitarian field are invited. Beyond this communication with NGOs respondent 4 mentions: “Other than that we always collaborate with other NGOs in scopes of different projects – such as climate change projects and we conduct regular meetings with them and round tables”, maintaining the constant contact.

The importance of building networks with suppliers was mentioned by four respondents. Interviewee 1 said that during the preparedness phase prior to the conflict the GRCS had long-term agreements with a food manufacturing company in Georgia as well as with the airport. These companies provided the immediate assistance during the conflict which will be further described in the analysis of the response stage. The study revealed that after the conflict, the GRCS felt the urge of expanding the Recourse Mobilisation unit within the organisation. “The unit was needed to increase the effectiveness of the response” - interviewee 4 says - “it was necessary to introduce new approaches for resource mobilisation and we had a capability for that. However it was extremely challenging”. During the current preparedness phase the department works on network building with different bodies and organisations aiming to increase the entire the GRCS’s capabilities for resource mobilisation. Currently the unit works on a fund (financial) resources mobilisation strategy, focusing on exploring and establishing partnerships with private companies and the public. In scopes of the strategy, a detailed market research will be conducted aiming to reveal the full picture about the potential companies whom the GRCS can have long-term partnerships with in future. Interviewee 4 explained that they already had a contract with one of the water producing companies in Georgia. From the sale of each bottle of water a certain amount of money was transferred to the GRCS. The contract was beneficial but ended due to the financial instability of the private company itself. This type of partnerships will be the aim for the Resource Mobilisation unit. In order to increase the effectiveness of the GRCS response, the Resource Mobilisation unit additionally plans partnerships with food and water suppliers with which other National Societies already experienced successful relationships. Mentioned examples were a partnership between Coca-Cola and the IFRC as well as with the TESCO group in England.

According to respondent 6, the relationships with suppliers are generally established in scopes of particular projects, where purchases are conducted based on certain procedures. Depending on the budget, the suppliers are selected either through price quotations or bidding processes. The bidding is normally announced through the information broadcasts. After receiving the offers from various suppliers, the tendering committee discusses options considering various criteria. The important finding is that the donor representatives are involved in the tendering committee. The representatives participate in bidding evaluations and are involved in the final suppliers’ selection process. This indicates that all the purchases are conducted in an agreement with the donor organisations. One of the key criteria for purchasing is cost efficiency and fastest delivery time. According to interviewee 6 the entire bidding process takes up to a month, however during emergencies fastening procedures might take place. These procedures give the secretary general of the GRCS the authority for immediate decisions about urgent supplies. After signing the contract, the goods are supplied in the central warehouse and packed accordingly. The final deliveries
are implemented through local municipalities. However, in some cases depending on the urgency and amount of goods to be distributed, trucks are hired to ensure transportations from the warehouse to the affected regions. Interviewee 6 explained that the GRCS is in constant contact with several truck owners, who proved to be reliable regarding on time and high quality deliveries, thus in case of emergencies they are first to be contacted. Due to the high level of trust, these companies might even be asked to provide additional contacts of other transportation providers.

The research found out that one of the key focus of the GRCS during the preparedness phase is on volunteers. The organisation has active volunteers who are all registered in a database. The GRCS permanently updates this database of volunteers. Based on interviewee 1: “in the database we have the ranking of them […] if something happens we are able to look for volunteers who were trained in particular skills.” The database reflects detailed qualifications of the volunteers and gives the flexibility to the organisation to mobilise additional volunteers in case of emergencies. All volunteers within the organisation are trained. The GRCS aims to maintain volunteers and to make the organisation attractive to them. “Sometimes they stay with us, but often there are rotations”, interviewee 1 states, “we care about the image of the GRCS”, which contributes to the awareness rising about the organisation. One of the findings of the study is that the number of volunteers at the GRCS has increased after the conflict. Interviewee 5 declares: “We got a really big pool of volunteers and although volunteers always were rotating, those volunteers brought their friends and when they went they brought more and more people”. So, the need for a volunteer management unit has also increased.

The importance of the proper inventory management was highlighted by five respondents. It was found out that during the preparedness phase, prior to the conflict, the GRCS, like other National Societies all over the world, kept a minimum amount of essential items and goods in stock for emergency situations. The organisation had one central warehouse in Tbilisi, where the goods were placed and packed. This procedure for stock keeping is the same in the post-armed conflict preparedness phase. According to interviewee 2, keeping a large stock is very costly. Respondent 6 says that there is no precise rule and requirement for the minimum amount of items kept in stock. It can vary from time to time. In many cases the stocks are donated from different organisations. Respondent 6 states: “the tents for example were donated by Iran Red Crescent in the past and we still have them. The US embassy also donated the large amount of different varieties of goods”. However, the control of stocks is carried out and in case of a significant decrease mobilisation activities take place. Respondent 6 points out that “if I realise that there is just one tent left, of course I will search for ways to refill the stocks again”. According to the existing strategy, the Resource Mobilisation unit works on strengthening the local branches’ capabilities by considering placing the minimum number of essential items close to the final recipients. This practice can be related to the practice of pre-positioning goods, which shall ensure the effective response of the regional offices. However, due to the high cost of pre-positioning, the GRCS mainly focuses on increasing resource mobilisation capabilities. According to interviewee 5: “during the conflict goods were supplied so quickly from the other National Societies”, indicating a benefit of the close partnership with the other National Societies in terms of procurement.
Together with proper inventory management, the importance of identifying product losses was also investigated during the interviews. Having an inventory reporting system is considered to contribute to meeting requirements for inventory management and product loss identification. However, during the preparedness phase, before the conflict, there was no warehouse IT-system used within the GRCS. No warehouse related IT-system exists in the current preparedness phase either; however interviewee 2 and interviewee 5 do not see the need of warehouse IT systems for identification of product losses. The goods are regularly controlled and recorded once they arrive, as well as when they leave the warehouse. The GRCS has the financial and accounting IT systems in the headquarters and additional control and reporting of the stocks are conducted by the finance department each month. The Interviewee 5 claims: “Of course it is always registered. Everything that goes into the warehouse and everything that goes out (every single item) is registered and is with proper documents. The work in the warehouse is managed properly so there is no fear that it gets out of control. The system that already exists in the GRCS with the finance department and warehouse manager is absolutely well functioning”. The existence of an efficient inventory management system in the GRCS was confirmed by the interviewee 6. The risk of product losses is also minimised by assigning a responsible person at each distributional level of goods and requesting signatures upon receipt of each single item. Despite the absence of the IT-systems in the warehouse, the warehouse manager keeps records of each single item’s movements. “It [product losses] is impossible to happen, especially with the financial system that we currently have. We do not experience losses” – emphasises interviewee 6. Furthermore, every pack of distributed items has the GRCS logo. In addition to the monthly accounts, quarterly reports are also delivered to the headquarters, containing information about current stocks and goods in the warehouse. However, based on interviewee 6, the GRCS sees desirable a warehouse IT-system, as well as the complex upgrading of the whole warehouse in accordance with international standards. “We want to implement these improvements as they would significantly simplify processes […] Processes would be made more dexterous which increases efficiency and effectiveness. Besides it is more comfortable as well” – interviewee 6 explains. However, this is related with high expenses and currently the focus is placed on finding a donor to fund the initiative. The interviews found out that the accuracy of demand management is very important for a cost-effective performance of the GRCS. It is ensured through a sound needs assessment process. During the preparedness phase before the conflict, the quality of needs assessment was ensured through delivering trainings to volunteers assuring their sufficient skills in assessing needs during emergencies. During emergency situations needs are assessed using a special method developed and tested by the IFRC – the Vulnerability Capacity Assessment (VCA). The VCA method was used for measuring needs for approximately 150,000 affected people during the conflict. The same approach is used during the preparedness phase after the conflict as well. VCA consists of a questionnaire with adjusted questions for the specific case. “During peace time we train our volunteers in VCA in order to ensure the accuracy in assessing needs” - says interviewee 1. Another research finding contributing to the accuracy of demand management in the current preparedness phase is the GRCS’ involvement in the computerised system called Amado together with other National Societies. Interviewee 5 stressed: “the programme contains constant updates about needs and availability of resources per each country involved”. This IT-system simplifies
the information sharing and visibility of needs and resources for the member countries. Additionally, mobilisation of resources takes place and donations are transferred accordingly based on the displayed needs. Together with needs assessments the on-going focus is placed on fundraising reflected in different forms, such as donation boxes placed in different locations, fundraising campaigns, food, non-food and second hand clothes collections.

The importance of knowledge management was highlighted by all six respondents, which in the GRCS is achieved through trainings and lessons learned practices. All interviewees mentioned lessons learned and knowledge management through reporting systems. Interviewee 1 referred to it as “the Institutional memory”. The monthly, quarterly and yearly performance reports are shared within the organisation. The transfer of knowledge is insured through analysing these reports and developing updated trainings and simulations based on the identified needs. Interviewee 4 stressed the importance of continues improvement through analysing success stories and reports of other National Societies. This type of experience sharing also takes place at conferences which are conducted on a regular base with the aim to strengthen the National Societies. “For the development we always collect ideas. In many cases there are some structured new ideas, but sometimes the innovative ideas also emerge, which we include in our list of improvements”. The GRCS has also been asked to share their experience about their well-organised financial system with other National Societies. This was done by delivering trainings to these National Societies.”

The GRCS pays special attention to trainings as a tool for continues improvement. As part of the trainings practice and to equip employees and volunteers with relevant skills, each newcomer receives a “welcome” package and induction courses. Interviewee 1 mentions: “we have over twenty types of different trainings: social support, first aid, psychosocial-support, advocacy, recourse mobilisation, home visits, and many more”. Interviewee 4 explicitly stresses the importance of the equal development of the GRCS employees all over the country: “Human resources in local branches must be trained, and we focus on capacity building that are crucial for ensuring readiness of them [the employees in the local branches] for the response during emergencies”. Additionally practical simulation cases are introduced to test the actual performance of employees. According to the GRCS contingency plan clear responsibilities are assigned to people to ensure the prompt response during the event. This plan is regularly practiced through simulations among staff, volunteers and key stakeholders. “We have thirty-six branches […] we guarantee that all the employees of all the branches receive the same trainings that the headquarters’ representatives do” – declares interviewee 4. According to interviewee 2 the trainings for the logistics department employees are planned based on the analyses of past experiences and identification of certain needs for the employees’ development. The interviews revealed collaborations of partner organisations and GRCS training practices. Often partner National Societies or donors deliver trainings for the GRCS employees. However, the GRCS has also been asked to share experiences and deliver trainings to partner organisations as well as to other National Societies. Interviewee 3 mentions one example where psychologists of the GRCS were included in the pool of master trainers. Being included in this pool, these psychologists joined an international meeting in Denmark where they shared experiences with their colleagues. Interviewee 3 further points out: “we
often have trainings of trainers where other colleagues from international societies are invited to conduct these trainings; [...] we grow all the time”. After the armed conflict, particular attention has been paid to disaster management related trainings aiming to enhance capacities of employees and to reduce the impact of disasters.

The research found out that between the preparedness phases before and after the conflict some strategic improvements have been made. As a result of the conflict, a structural change decision has been made to establish the Resource Mobilisation unit. Interviewee 4 mentioned that “the most important part is to ensure the public society’s readiness for events. This means increasing capacities and resource mobilisation locally”. Strengthening the resource mobilisation part within the organisation is seen as a contribution to enhanced flexibility of the organisation, as well as to a cost efficient and fruitful response. Due to the same reason after the conflict special attention has been paid to the enhancement of the disaster management department. Disaster management did not exist before 2007; however it has now been defined as a priority direction for the GRCS. It was performed only in the form of delivering basic trainings about awareness rising. Interviewee 5 clarifies that “there is always a fear of natural disasters and also armed conflicts might happen in every country”. Thus, after the conflict, special programmes were launched aiming at disaster preparedness and disaster risk reduction. These projects are implemented in collaboration with other organisations such as Oxfam, UNICEF, and Save the Children aiming to increase the capacities of the GRCS for the response phase, as well as to minimise the results of disasters. Currently the department runs a number of activities, such as trainings, establishing volunteer community teams among them disaster response teams, simulation exercises, vulnerability and capacity assessments, advocacy campaigns, working with local authorities, establishing operational centres. According to respondent 6, “the aim of these programmes is to educate people about when and how to behave in case of emergencies. Accordingly the simulations are organised as realistic scenario as possible, where local governmental municipalities are also involved. As a result of the programmes, people living in these regions are better prepared for the response to the disasters and emergencies. These programmes are strongly supported by the international donors as well as the sister National Societies. A number of risk reduction projects are funded by the European Commission, the ICRC, the Danish Red Cross, the Austrian Red Cross, and the Icelandic Red Cross Societies. This additionally demonstrates the importance of the partnership between National Societies during the preparedness phase supporting each other in order to increase the local capacities for the emergency response.
During analysing the interviews it has been found out that the case organisation in the response phase of the armed conflict strongly relied on built networks in form of collaborative relationships or partnerships.

Partnerships exist in the form of long-term business arrangements. According to respondent 1 the GRCS already had existing contracts with different companies when the conflict started in 2008. One long-term agreement had been established during peace time with a Georgian food company that usually delivered food for elderly people. As interviewee 1 states “they [the partners] are the main target group of GRCS during the peace time so we keep contracts with them”. The GRCS benefited from this partnership during the conflict when the food company provided food to the people affected by the conflict. New partnerships also resulted out of private businesses offering their help during the armed conflict. As explained by respondent 5, during the conflict this was the case with the local branch of an international organisation that approached the GRCS. This company offered to provide affected people living in the tents with mattresses, quilts, sleeping equipment and hygiene parcels. Interviewee 4 underlines the resulting long-term relationship “after first assistance later for several times they participated in our charity activities which also aimed at supporting some vulnerable children and those who were residing in the children house. After the recovery phase this company supported us to help some other people not only those affected by the conflict”. In the case of the GRCS and its integration in the International Red Cross and Red Crescent Movement there is a very strong partnership with the other 189 Red Cross Red Crescent National Societies which was emphasised by almost all respondents. In the response stage of the conflict, the partnership with the other Red Cross Red Crescent National Societies was of special importance. As interviewee 2, who was responsible for the logistics processes, states “the conflict case differed a bit due to its specificity and the urgency”. During the interviews it was found out that the GRCS only keeps a minimum stock of relief items in its own central warehouses. Therefore, the society was dependent on the support of its partners. Major amounts of goods were brought by Red Cross National Society partners. Interviewee 2 describes this situation “we did not purchase anything and no biddings were announced, […] huge international aid came from the Red Cross in Kuwait”. And also other Red Cross National Societies helped. After the

### Table 14: Response stage - code and respondent matrix

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armed conflict in 2008 started, the Turkish Red Cross “due to its close location to Georgia and its really good stock”, arrived within twenty-four hours being “one of the first ones to arrive” and “providing several trucks of goods” as interviewee 5 points out. The Italian Red Cross arrived on the third day supporting the GRCS with the Soup kitchen and serving 10,000 hot meals to the internally displaced persons every day. Interviewee 1 emphasises that “this is the type of partnership, this is well coordinated”.

A close collaboration during the conflict was also held with the national and local governments mainly for distributing the relief items to the beneficiaries. This collaboration was necessary since the GRCS was not optimally prepared for a major event like the conflict, “this type of event was absolutely new for the organisation and the governmental bodies were hugely supporting” as stated by interviewee 2. Further, respondent 2 explains the need for this collaboration by saying that “it was impossible for us to distribute the aid to the final recipients ourselves”. From the central warehouse the GRCS was transferring relief items to the local authorities and they were ensuring deliveries to the final recipients. The close partnership with the other Red Cross Red Crescent National Societies and the collaboration with the government allowed a very fast distribution of relief items to the beneficiaries. Respondent 4 supports this by saying that “the process [of distributing the relief items] was so fast, we did not really have time to store the cargo. We worked in 24 hour shifts and distributed cargo immediately”. Interviewee 4 further explains that “for example the cargo that arrived from Turkey by trucks was immediately distributed to refugees. This resulted in a very short distribution time of the material from the starting point to the final recipients.” Besides these partnerships, respondents 1 and 5 point out that the GRCS held collaborative relationships of short-term nature with several local supermarkets and restaurants that provided food at the end of each day. However, these relationships were limited to the time of the conflict. The food was picked up and distributed by some of the numerous volunteers which is supported by respondent 1 “we had very good contacts with local restaurants and shops, so volunteer groups were collecting the food and distributing to the people.” During the interviews, the importance of the network of volunteers was mentioned several times. At the beginning of the conflict activating these volunteers of which many receive regular trainings as part of the preparedness stage was one of the first activities. This was emphasised by respondent 4 saying that “the first step we took was the human resources mobilisation. Based on our database, we recalled volunteers.”

Needs assessment is another practice within the response stage supporting the requirement of market/customer sensitivity. Three out of the five respondents mentioned the importance of volunteers, who were strongly involved in the needs assessment activities. Activating the volunteers was fast using the volunteer database. Respondent 4 recalls that it “took half a day approximately”. Some of these volunteers used existing questionnaires as respondent 1 explains “the questions were adjusted for the specific case, and our volunteers visited the collective centres, also tent camp inhabitants asking, evaluating, and assessing what particular needs they had by that time.” Respondent 5 further specifies that “the data resulting from the VCA was passed on to the responsible team.”

Analysing the interviews it has been found out that the practice of aligned processes, which supports the requirement of process integration, can be found in the case organisation. As
indicated before, in the case of the conflict no relief items were purchased. Major contributors of relief items were the other Red Cross National Society partners. Among some of the Red Cross National Society partners integrated processes can be found. Based on the needs identified through the VCA the mobilisation of resources can take place as pointed out by respondent 2. The integration and harmonisation of processes is generally aimed for with the Red Cross National Society partners. This is indicated by respondent 5 who points out that there is a strong exchange between the different societies “our financial system was so well organised and well set that the financial manager has been invited to provide some training to the financial department of other National Societies”.

The importance of continuous information exchange supporting supply chain virtuality was emphasised by respondent 1 and 4. Respondent 1 explains that one of the major activities of the task force (established during the response to the armed conflict 2008), that was responsible for coordinating all actions, was giving “regular updates about the situation in Georgia on our web-site.” As reported by respondent 1, announcing information to the public on the web-site was very useful for the mobilisation of additional volunteers and resources. Information was also provided on a regular basis to the Red Cross National Society partners. Respondent 1 specifies that “this information exchange also included communication and coordination with the key stakeholders, [such as] the government, other humanitarian organisations, and NGOs”. To ensure good coordination between the headquarters and local branches, respondent 1 point out, that information was shared “especially with representatives of the local branches of the affected regions which allocated the large number of people remained without homes”.

Reconstruction Phase

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Table 15: Reconstruction stage - code and respondent matrix

The analysis of the interviews indicates that also in the reconstruction phase collaborative relationships can be found between the case organisation and different parties. Respondent 5 states that after the immediate response to the conflict had ended, psychologists of the GRCS were involved in a project which was supported by a local commercial bank. As part of the project, summer camps for children of internally displaced families at the seaside were organised. This interviewee further explains that “this camp was organised four or five times with support of this bank.” However, “this was a single cooperation. The commercial bank did not continue with support, it was during the recovery phase only.”
Needs assessment was also conducted during the reconstruction phase of the armed conflict. As part of the reconstruction stage the GRCS started a winter overcoming support programme so call Winterization project. “GRCS provided warm cloths, socks and boots for each affected family. It was extremely difficult to deliver the goods with appropriate sizes” explains respondent 4. Further interviewees 4 and 6 stress the important role of volunteers in the need assessment process saying that needs were identified through volunteers. In the reconstruction stage there is a high focus on purchasing material cheaper (thus ensuring the quality) and more cost-effective. This is attempted with buying materials locally as explained by respondent 4.
6 Discussion

After analysing the data in the previous section, this section will cover discussions of findings in regards to the theory presented in the literature review section of this thesis. The discussion aims at satisfying the second research objective which is to explore and test the applicability of commercial supply chain practices to the humanitarian supply chain.

6.1 Preparedness phase

The research indicated that the preparedness and response phases are strongly interconnected. The fact that a well organised preparedness phase can increase the effectiveness of the response phase and thereby decrease the impact of the disaster (Van Wassenhove, 2006, p. 480) is supported by the findings of this research. The case organisation demonstrated an increased focus on preparedness activities. Aiming to reduce the response time during emergencies and to decrease the level of damages at the same time (Kovács & Spens, 2007, pp. 102-103), the case organisation has introduced a number of initiatives in the current preparedness phase, such as establishment of a Resource Mobilisation unit or the development of the Disaster Management department. These activities additionally contribute to reducing costs of the response actions (Peter et al., 2010, pp. 614-615). The above mentioned structural initiatives aim to increase awareness within the public society during the preparedness phase, as well as enhance resource mobilisation abilities of the organisations, aiming at increased flexibility and effectiveness during the response stage.

In order to meet the characteristics of a lean supply chain, the following requirements should be met - network building, proper inventory management, identification of product losses, accurate demand management and knowledge management (Kunz et al., 2012, p. 2; Taylor & Pettit, 2009, pp. 434-435). The focus on these requirements were present in the empirical findings of the case organisation, however they had been achieved through different practices compared to the initial theoretical framework. To meet the network building requirements, humanitarian organisations put a special focus on relationships with suppliers (Cozzolino et al., 2012, p. 20; Van Wassenhove, 2006, p. 481). This practice was met by the case organisation, as a guarantee for the better and speedy resource mobilisation. The studied organisation had a long-term contract with a food manufacturing company, which was reflected in prompt supplies of food to the affected people during the response phase. The importance of this type of partnerships is additionally strengthened by the empirical proof that the case organisation still keeps contracts with them to ensure the long-term support during the needs occurrence. Additionally establishing relationships with private organisations appeared to be the strategic priority for the organisation. The partnerships with private companies can have different natures in form of either financial or material support. The main focus is placed on long-term partnerships for food and water supplies. As for the financial support interviewee 4 gave us the example of money donations from private companies from each sold item. Thus partnerships with the private sector during the preparedness phase contribute significantly to increased effectiveness during the response phase, which is in line with Van Wassenhove (2006, p. 480).
Apart from the initial theoretical framework, in scopes of the network building requirement, the study revealed the importance of donors, other aid organisations, NGOs, governmental bodies and volunteers. In case of the studied organisation the strongest partners appeared to be the member National Societies of the International Movement of the Red Cross and Red Crescent. The participation of these organisations during the response phase is a key point; accordingly building strong relationships during the preparedness phase is very important, so particular attention is paid to enhanced collaborations among them. This is justified by the fact that the IFRC supports the cooperation between National Societies during preparedness phase. To build and maintain relationships with donor organisations during the preparedness phase appeared to be important, since donors normally demonstrate hesitation to contribute to the preparedness phase and mostly provide support during the response phase (Kovács & Spens, 2007, p.110; Van Wassenhove, 2006, p. 482). Based on the case organisation, vast attention is paid to relationships with donors, especially local donors. Additionally, donors have a high influence on the humanitarian organisations, their processes, and transparency of supply chains (Van Wassenhove, 2006, p. 477). To ensure the transparency of the donated fund expenditures, in the case of the studied organisation, the donor representatives are included in the tendering committee during the procurement process, which at the same time contributes to the donors’ increased trust towards the humanitarian organisation.

To find ways of cooperation with governments, military bodies and other aid organisations is considered to be important for humanitarian organisations (Van Wassenhove, 2006, p. 481). The study revealed that network building with governmental bodies during the preparedness stage was mutually important for both parties: The GRCS and the government. Accordingly special attention was paid on partnerships between them during the preparedness phase. In case of the GRCS, the signed memorandums of understanding with local municipalities about assisting the humanitarian organisation in distributing goods increased the speed of deliveries during the response phase. After the studied event, the partnership has strengthened even more, which is reflected in the auxiliary role of the GRCS to the government. Additionally the need of constant communication with NGOs during the preparedness phase proved to be important in the studied case. The regular meetings during the preparedness phase contribute to the coordinated behaviour as well as to constant information sharing about available capacities (Lin et al., 2006, p. 288; Naylor et al., 1999, p. 109; Womack & Jones, 1996, p. 141). During the peace time partnership are additionally ensured by implementing various projects together.

Human resource management is one of the critical elements of the preparedness phase, as people with special skills, which are required for relief operations, are the basis for a successful performance (Van Wassenhove, 2006, p. 481). The research found out that volunteers represent one of the key parts of the GRCS human resources since most of the activities are implemented by them. During the preparedness phase the case organisation delivers trainings to volunteers in order to develop the required skills for the response phase (Womack & Jones, 1996, p. 141). At the same time the organisation aims to make the GRCS attractive and to establish strong links with them. The studied event additionally stressed the important role of volunteers with the consequence that the Volunteer Management unit was increased.
In order to eliminate waste which is one of the main characteristics of leanness, proper inventory management should be implemented (Kunz et al., 2012, p. 2). Although usually inventory is related with high expenses, the research explored that in case of the GRCS keeping the certain amount of inventory during the preparedness phase is reasonable, as it enables the organisation to respond quickly during disasters (Holguín-Veras et al., 2012, p. 496; Kunz et al., 2012, p. 2). The GRCS has the centralised inventory management system, which is reflected in possessing one central warehouse in the capital where the minimum amount of stocks is kept. Based on the studied event this practice supported the organisation to respond to the emergency more effectively. Although the inventory can be pre-positioned close to the disaster prone areas in warehouses, this practice requires high investments (Holguín-Veras et al., 2012, p.496; Kunz et al., 2012, p. 2). Due to this reason the organisation does not pre-position inventories in regions, however considering its contribution to the speedy response, the GRCS finds this practice desirable. The minimum amount of stocks kept in the central warehouse can vary time by time, however the constant monitoring of inventory takes place and in case of a decrease, the organisation takes care to fill the stocks. Together with pre-positioning, the inventory reporting system has also been identified as a practice for proper inventory management, which was stressed by all the respondents. This practice is also used to meet the requirement of identification of product losses (Taylor & Pettit, 2009, pp. 434-435) Usually IT systems are used to increase the visibility of inventory and to support the information flow (John et al., 2012, p. 499; Taylor & Pettit, 2009, pp. 434-435). However, in case of the studied organisation no IT-systems for warehouse inventory accountability were claimed to be needed to ensure the elimination of product losses. This direction is regulated by the financial department, which is highly controlled using various computerised accounting and reporting systems. The close monitoring of the inventory upon arrival and departure of the warehouse prevents the organisation from lacking the information about stocks. Additionally the risk of product losses is eliminated by increased control and reporting systems at each distribution level, reflected in assigning a responsible person and obliging them to signatures. However, the advantages of IT systems for the warehouse were recognised by the case organisation as a tool for dexterous and simplified processes that could increase the efficiency and effectiveness of the supply chain.

The accuracy of needs assessment plays a significant role in proper demand management which leads to minimising waste and ensures delivering the right products at the right qualities to the locations where disasters happen (Beamon & Balcik, 2008, p. 9). This practice is met by the empirical evidence of the research. During the preparedness phase in the studied organisation the focus on the needs assessment is made through introducing improved processes as well as delivering trainings to volunteers to develop essential skills required for achieving accuracy in assessing the needs. Additionally the literature review revealed that computerised systems are also used for obtaining accurate and prompt data about needs (Christopher, 2000, p. 38). A number of National Societies use shared IT system where the information about particular needs of countries is displayed. This system additionally contributes to the resource mobilisation and fundraising, as all the member countries can ensure the financial support to the country demonstrating the need.

One of the key characteristics of lean supply chains is continues improvement, which requires adequate knowledge management. In the initial theoretical framework the
trainings/lessons learned practices were put together to be tested. The study of the case organisation revealed that continues improvement is achieved in the organisation through explicit attention towards trainings and lessons learned separately. During the preparedness phase the knowledge management is achieved through transferring previous experiences and knowledge contributing to continuous learning (Van Wassenhove, 2006, p. 481). The studied organisation proved that analysing all the processes and combining with lessons learned appeared to be very influential for process and performance improvements (Van Wassenhove, 2006, p. 481). The knowledge management within the organisation is ensured through reporting systems - “the Institutional memory”. The reports of the activities are archived and further analysed in scopes of the lessons learned practice. Additionally, experiences of other National Societies are also shared and taken into consideration. Based on the reports the contained knowledge is analysed which is reflected in improved trainings and simulations and delivered to employees and volunteers within the organisation. Trainings during the preparedness phase are one of the key focuses of the organisation, as development of human resources and equipping them with essential skills contributes to the effective response during disasters (Van Wassenhove, 2006, p. 481). This practice is highly shared by the study organisation, reflected in delivering a number of trainings to employees on a regular base. Additionally, equal attention is paid to development of employees and volunteers of local branches, which aims at readiness of the overall organisation for disaster events.

6.2 Response phase

In the response stage of the armed conflict in 2008, the GRCS strongly relied on their networks of longer-term business partners and various collaborations rather than short-term nature. The need of a network-based supply chain approach to achieve agility is aligned with commercial supply chain literature (Christopher, 2000, p. 39; Christopher & Towill, 2000, p. 208; Van Hoek et al., 2001, p. 141). A major benefit of strong networks in the response stage is the possibility to shorten the response time (Cozzolino et al., 2012, p. 19). At the GRCS a fast response to the outbreak of the war was possible within twenty-four hours with the help of other Red Cross National Society Partners, such as the Turkish Red Cross Society delivering relief items. Given that the GRCS only had a small stock of relief items available, this support of the network partners and the access to their competences was indispensable. The necessity of joint actions between network partners is also mentioned in existing literature (Lin et al., 2006, p. 288). These can be found in the various collaborations the GRCS was undertaking with the government, local restaurants and supermarkets. For example, the joint activities with the government were crucial since the GRCS would have not been able to manage the distribution of the relief items itself.

The requirement of market/customer sensitivity was identified at the GRCS based on their thorough needs assessment practice. According to existing literature the ability to identify real customer requirements and the operational environment quickly is necessary to survive in volatile markets. For commercial supply chains, IT systems are often suggested to achieve market sensitivity (Christopher, 2000, p. 38; Lin et al., 2006, p. 288; Van Hoek et al., 2001, p. 139). However, in the case organisation the use of IT for the needs assessment process was inexistent during the response stage. Due to the well-working manual needs
assessments process, with the help of trained volunteers, there was no urgent need seen by the GRCS to introduce such IT-systems. Although the GRCS does not use an IT-system it can be said that the organisation achieves the agile requirement of market/customer sensitivity. This can be explained by their fast and effective response within the first twenty-four hours after the armed conflict started, using the manual needs assessment practice they have in place. As stated by Charles et al. (2010, p. 725), the characteristic of enhanced responsiveness can be achieved through high levels of reactivity, which is the ability to assess and respond to needs quickly, and velocity, which is the ability to fulfil needs promptly. These capabilities were achieved by the GRCS. Nevertheless, some others criticise the largely manual supply chain processes and argue for a high improvement potential (Thomas & Mizushima, 2005, p. 60).

Another requirement for achieving agility is process integration. Process integration can also be identified in the response stage of the GRCS. According to Lin et al. (2006, p. 288) process integration can be defined as a strong cooperation between suppliers and buyers where information is transparently shared, joint strategies are pursued, and common systems are used. According to existing literature, integrated processes create value by enabling seamless supply chains between supply chain partners where information, knowledge, and physical assets can be transferred at a high speed. The literature usually refers to advanced IT or shared databases as major enabler for process integration (Yusuf et al., 2004, pp. 379-380). Although the GRCS did not have the Amado-system in place at the time of the armed conflict, this shared database between some of the Red Cross National Societies demonstrates a common system used and an integrated process. Besides, all National Societies follow the same principles. This is an indicator of their close partnership and can be seen as a joint strategy that is in place.

Finally, the GRCS also realises continuous information exchange and data sharing between all supply chain partners and stakeholders, such as the other Red Cross National Societies, other NGOs, governmental bodies, and the public. The Amado-system is one example of an IT used to exchange information, which facilitates a virtual supply chain that is information-based (Lin et al., 2006, p. 288). Virtuality is another requirement identified in the theoretical framework for agile strategies which is achieved by the GRCS. Besides, during the war the GRCS shared information and updated them regularly with all parties involved through Internet on the organisation’s website. Using internet is one possibility mentioned in commercial literature to ensure supply chains virtuality. Electronic data interchange (EDI) is another approach (Christopher, 2000, p. 38); however, it is not used by the GRCS for the response stage yet.

6.3 Reconstruction phase

The reconstruction phase may last for years after the occurrence of a disaster. During this stage the humanitarian organisations focus on rehabilitation of the affected communities (Beamon & Balcik, 2008, p. 5). In order to support victims of disasters to return to a normal life and to ensure faster recoveries (Beamon & Balcik, 2008, p. 5), the case organisation had carried out several activities such as: psychosocial-support, restoring family links, arranging summer camps for affected children and a winter overcoming programme. Based
on the initial theoretical framework, the following practices were identified to be tested for the reconstruction phase: needs assessment, networking with suppliers, trainings/lessons learned and pre-positioning. The study confirmed that during this stage the demand appeared to be more predictable (Taylor & Pettit, 2009, p.437; Van Wassenhove, 2006, p.481), however accuracy of the demand management was still very important for cost-efficiency purposes. A strong focus was placed on accurate needs assessment (Beamon & Balcik, 2008, p. 9), which was conducted by using the same tools as during the response phase. Therefore, the demand from the affected people for the winter overcoming programme was assessed with the help of volunteers using the VCA forms. The literature refers to the practice of networking with suppliers during the reconstruction phase. In case of the studied event collaborative relationships with private companies were found. Numbers of programmes were implemented with the support of local private companies, as well as National Societies and the Government of Georgia. These types of collaborative relationships represent the practice of the agile supply chain (Lin et al., 2006, p. 288), which indicates the overlapping nature of lean and agile characteristics (Naylor et al., 1999, p. 109). Additionally pre-positioning and trainings/lessons learned practices were expected to exist in the reconstruction stage (Kunz et al., 2012, p. 2; Van Wassenhove, 2006, p. 481), however the research of the case organisation revealed that during the studied event the organisation has not applied these practices.

6.4 Adjusted theoretical framework

While analysing the interview transcripts it was revealed that some of the lean and agile practices identified in the initial theoretical framework for the certain humanitarian supply chain stages were not mentioned or were not carried out in the particular supply chain stages. On the other hand some of the previously identified requirements for lean and agile characteristics were fulfilled but using different practices or by placing more importance to certain practices which were not individually listed in the initial framework. These findings require the development of an adjusted framework where all occurring practices and fulfilled requirements are considered. The adjusted framework is presented in Figure 8.

In the preparedness stage all requirements supporting the lean characteristics which are waste elimination, optimal cycle times, and continuous improvement remain the same in the initial and the adjusted frameworks. However, some of the practices supporting fulfilment of each requirement were adjusted. The first requirement, network building, was expanded to include networks consisting of donors, suppliers, volunteers, other NGOs, and governmental bodies. In the initial framework only suppliers were included since, based on the literature, it was assumed that the network of suppliers was the most important relationship of the humanitarian organisations. However, in the case organisation, especially for the new preparedness stage which is influenced by learnings of the armed conflict, great importance was attributed to the collaboration with the Georgian government. This close relationship also influences the strong cooperation with the other NGOs since the GRCS was responsible for coordinating the NGO’s activities during emergencies. Volunteers were attributed special attention due to their involvement in many activities, such as needs assessment, which are largely conducted manually. Additionally, the relationship development with donors was of great importance due to the weak business
environment, mentioned by several respondents, resulting in some difficulties to find partners of the private sector. For the requirement, knowledge management, the practice of trainings and lessons learned was split due to the great attention paid to these two practices separately. Within the preparedness stage, the requirement of network building was split into collaborative relationships, indicating rather short-term, single-case joint activities, and partnerships, referring to long-term joint activities. Volunteers were stated separately due to their major role in the needs assessment process.

During the response stage all the requirements from the initial theoretical framework were present in the supply chain of the case organisation. However, the study additionally revealed the practice of strongly incorporating volunteers into the network and of building long-term partnerships within this phase. Thus, these two practices were added in the response stage of the adjusted theoretical framework.

In the reconstruction stage, for the requirement of network building, the corresponding practice was adjusted to collaborative relationships, which represents the characteristics of the agile supply chain indicating about overlapping nature with leanness. This adjustment is explained by the single-case joint activity with commercial companies that were limited to one event. The practice of inventory pre-positioning could not be identified in the reconstruction stage of the case organisation and consequently this practice was removed from the framework. The requirement of knowledge management with the corresponding practice of trainings and lessons learned holds a special role in the adjusted framework. Knowledge management has been identified as requirement for continuous improvement, a characteristic of a lean supply chain. In the case of the GRCS it became evident that a lot of learnings as well as changes and trainings associated with these learnings were caused by the identified strengths and weaknesses during and after the armed conflict. Thus, the arrow at the bottom of the framework shall indicate the influence of post-reconstruction stage learnings on the new preparedness stage. Thus, continuous improvement can be described as an iterative process between the reconstruction and the new preparedness stages. This is aligned with the assumed lean strategy especially in the preparedness stage.
Figure 8: Adjusted theoretical framework
7 Conclusions

In the conclusions section, first a general conclusion with the key findings and answers of the research questions will be provided. This is followed by managerial and theoretical implications as well as limitations and recommendations for future research.

7.1 Conclusion

The thesis was motivated by potential cross-learning opportunities between commercial and humanitarian supply chain management practices and the need for improvements of humanitarian supply chains, identified in existing literature. The concepts of lean and agile supply chain strategies from the commercial context were selected with the aim to test their applicability to humanitarian supply chains. From existing literature in the commercial and also humanitarian field it was identified that lean and agile supply chain strategies are strongly connected and that they often occur in the form of a hybrid, so called le-agile strategy. Three ways of combining lean and agile strategies have been discussed in the literature review of this thesis. A gap in humanitarian supply chain literature was identified in terms of combining lean and agile strategies with respect to the specific objectives of the different humanitarian supply chain stages – preparedness, response, and reconstruction.

This motivated the first research question: How can lean and agile strategies of commercial supply chains be combined with the humanitarian supply chain preparedness, response, and reconstruction stages? In order to answer this question, an extensive literature review of commercial and humanitarian supply chain management was conducted. Based on the literature, it was discovered that the preparedness and reconstruction stages, operating in a more stable environment, have a high focus on efficiency and cost savings. Operating in a very unstable environment, the response stage’s focus was detected to be more on effectiveness and speed. Due to the different foci per supply chain stage, the le-agile strategy combination from the commercial field based on “base” and “surge” demand was applied. Thus, based on the literature, the combination of lean and agile strategies with the different humanitarian supply chain stages was identified as follows:

| Lean strategy “base demand” | ➔ Preparedness stage: focus efficiency, optimisation and cost savings. |
| Agile strategy “surge demand” | ➔ Response stages: focus on effectiveness and speed |
| Lean strategy “base demand” | ➔ Reconstruction stage: focus efficiency, optimisation and cost savings. |

Table 16: Combination of lean & agile strategies with humanitarian supply chain stages

On the basis of the results of the first research question and based on the literature, characteristics of lean and agile supply chains were investigated. Requirements to achieve these characteristics were identified as well as practices which would fulfil the requirements. This aimed at answering the second research question: What practices supporting lean and agile strategies from commercial supply chains are applied during the
preparedness, response, and reconstruction stages of the humanitarian supply chain? Semi-structured interviews were conducted in one case organisation where the occurrence of the identified lean and agile practices was tested. The findings are illustrated in the adjusted theoretical framework in Figure 8. It can be concluded that in the case organisation agile practices were found in the response stage of the case organisation. The findings further reveal that not all lean practices suggested in the commercial supply chain literature were applied in the preparedness and reconstruction stages likewise. Lean practices were used in both supply chain stages, strongly in the preparedness stage and to some extent in the reconstruction stage. Another finding indicates that lean and agile practices support each other and are strongly related, which was especially the case for preparedness activities supporting a quick and agile reaction to the armed conflict in the response stage. Additionally, it can be said that the reconstruction and preparedness stage of the GRCS’ humanitarian supply chain are linked through an iterative process of continuous learning and improvements, indicating leaness.

7.2 Managerial Implications

The present study takes the managerial standpoint into consideration. It is claimed that the research outcome can be useful for humanitarian supply chain practitioners. However, it is important to mention that the aim of this study is not to provide statistical generalisations that would allow an inference to a population. Instead, this thesis aims for an analytical generalisation. Based on this it is not possible to claim the findings’ applicability to all humanitarian supply chains and attempted transfers of findings to different contexts should only be done under great caution. However, there are recommendations provided below to be taken into consideration by practitioners while using the present research findings.

Humanitarian supply chain practitioners should be aware that supply chains can differ considering the nature of the disaster, geographical location, and structure of the organisation. This study focuses on the supply chain of a Georgian humanitarian organisation and explores the event of an armed conflict. Practitioners should understand the importance of lean and agile concepts for increasing effectiveness and efficiency in order to benefit from their applicability to the humanitarian supply chain. Considering the characteristics of leaness and agility, these two concepts often demonstrate an overlapping nature, which practitioners should be aware of. There are several methods of mixing lean and agile strategies, while this study focuses on creating a le-agile approach based on the “base” and “surge” demand strategy. When planning a le-agile strategy, practitioners should consider the different supply chain stages with their specific objectives and operational environments. It is also notable that lean and agile approaches have a number of practices that can possibly be found in or applied to humanitarian supply chains, however the thesis on hand examined the following practices per stage: lean practices for preparedness stage – networking with donors, suppliers, NGOs, government, volunteers, inventory pre-positioning, inventory reporting system, needs assessment, trainings and lessons learned; agile practices for response stage – collaborative relationships, partnerships, volunteers integration, needs assessment, aligned processes, and continues information exchange; lean practices for reconstruction stage – collaborative relationships, inventory reporting system, needs assessment. The applicability of these practices should
be preceded by considering the strategic and operational and direction and practices of the particular humanitarian organisations. Another important recommendation is to take into consideration the economic and political situation of the country where the humanitarian organisation is based in. These circumstances have a significant influence on the requirement of network building, because in developed countries where the business environment is stronger, humanitarian organisations might have more opportunities for partnerships with companies, while in less developed countries they might have to rely more on donors, as it is the case for the GRCS. Furthermore practitioners should understand and consider that these findings are context specific.

7.3 Theoretical Implications

The present research was conducted using the case-study strategy which gave us the opportunity to explore in-depth real-life practices of the study area (Creswell, 2013, p. 97; Easton, 2010, p. 118; Piperopoulos, 2010, p. 499; Stake, 1995, p. 2; Yin, 2009, p. 18). Analytic generalisation was used to contribute to the existing literature and a theoretical framework has been developed integrating findings of the research.

The current research contributes to existing humanitarian supply chain literature by exploring and testing commercial supply chain lean, agile, and hybrid (le-agile) practice’s applicability to different stages of the humanitarian supply chain - a research field which is under-investigated by researchers. The findings of this research support existing literature of humanitarian and commercial supply chains, which claim that lean and agile strategies can exist in different phases of a single supply chain (Christopher & Towill, 2000, p. 206; Naylor et al., 1999, p. 107; Scholten et al, 2010, p. 627). Within humanitarian supply chain literature there is a gap regarding the combination of commercial lean and agile strategies as a hybrid strategy. A possible hybrid strategy in the form of the separation of “base” and “surge” demand was deemed under-investigated (Taylor & Pettit, 2009, pp. 442-443). The findings of the present thesis contribute to filling this gap by focusing on the before mentioned combination. The use of the commercial hybrid approach of “base” and “surge” demand for humanitarian supply chains is in line with the further gap in current humanitarian literature regarding the existence of lean and agile strategies in the distinct stages of the humanitarian supply chain – preparedness, response, and reconstruction (Cozzolino et al., 2012, p. 17; Taylor & Pettit, 2009, pp. 442-443). The current thesis aims to contribute to existing literature by proposing a theoretical framework that connects the “base” and “surge” demand model with lean and agile practices as well as the different humanitarian supply chain stages.

The empirical evidence indicates that during the preparedness stage lean practices were used, which supports the connection of base demand with lean strategies. Additionally, the existing literature lacks the empirical evidence of lean practices in humanitarian supply chains in general and in particular in the preparedness stage (Cozzolino et al., 2012, p. 17; Taylor & Pettit, 2009, pp. 442-443), which is supported by the empirical findings of lean practices in the preparedness stage of the case organisation’s supply chain. The empirical proof of this thesis strongly supports the link of the surge demand with agile strategies in the response stage. This contributes to existing literature arguing for the applicability of
agile strategies in humanitarian supply chains (Charles et al., 2010, p. 736). However, the empirical findings only provided little support for existing research claiming the existence of lean practices in the reconstruction stage (Cozzolino et al., 2012, p. 17). The event of the case study examined the supply chain practices during an armed conflict, which provides empirical evidence for the under-investigated field of slow-onset man-made disasters (Leiras et al., 2014, pp. 108-109).

Overall, this thesis supports the suggestion of existing humanitarian supply chain literature that commercial lean and agile practices can be applied in humanitarian supply chains. The lean and agile practices presented in the adjusted theoretical framework in section 6.4. contribute to the humanitarian supply chain literature by providing the basis for further research. The strong empirical evidence for the importance of networks in the supply chain of the case organisation demonstrates some components of network theory. Network theory is typically considered in the context of commercial supply chain literature (Håkansson & Ford, 2002, p. 134; Hálldorsson, 2007, p. 285), however the findings might indicate that network theory could also underlie humanitarian supply chain literature. The same viewpoint might apply to the resource-based view as the case organisation demonstrates a strong focus on continuous improvement, which could be related to the development of internal competences. However, the specificity of the humanitarian supply chain context needs to be considered, which could motivate further research.

7.4 Limitations and future research

Several limitations have been identified for the present research. Conducting a qualitative study with a case study strategy may have caused bias of findings and ambiguity, regardless of the mechanisms applied for preventing them. As the research involved the study of the humanitarian supply chain of only one case organisation, future research would be recommended to investigate more organisations. This wider context could provide in-depth understanding of the phenomena on a broader scale. A quantitative approach with a large random sample could also be applied to increase objectivity of findings and to deliver more generalizable outcomes. Statistical generalizability cannot be claimed for the thesis on hand due to its nature of a single case study. Additionally, a quantitative approach would give the opportunity to use performance measurements enabling researchers to provide the explanatory features of the present research such as the applicability of lean and agile practices to different stages. Further testing of the applicability of commercial lean and agile supply chain practices to the humanitarian supply chain is also recommended, as well as a further investigation of the combination of supply chain stages and le-agile strategies. The exploration of the degree of the overlapping nature of lean and agile characteristics would also be interesting. Future research is required to study the topic by investigating different types of disasters (natural and man-made). The study on hand only focused on the case in Georgia, thus future research would be recommended to investigate the humanitarian supply chains operating in different countries.

Although the case study strategy gives the opportunity to employ a variety of data collection methods, in the present research only semi-structured interviews were used. This might raise reliability concerns, which could be prevented by employing a quantitative
approach with standardised interviews. Due to geographical limitations, as well as investigating an event that took place in the past, no observations were possible and the request of providing study related documentation for the analysis was rejected due to confidentiality. In case of using the same research strategy in a future study, researchers could overcome this limitation by generating broader data through more data collection methods. During the research, Skype voice calls were used as data collection tool for conducting the interviews, which did not give the opportunity to the researchers to observe the behaviour of the respondents, their expressions and concerns, which might have had an influence on the data outcome. Another limitation is related to language barriers. None of the respondents were native English speakers, neither the two researchers. One of the researchers does not speak Georgian. This increased the risk of misunderstandings and misinterpretations of the information. These types of limitations are recommended to overcome by conducting face-to-face interviews conducted in the native language for both parties.
References


Appendix

Appendix 1

Interview questions GRCS:

1. Introduction (explanation of purpose and topic of thesis, ensuring that there are no language barriers): Would you mind if the interview is recorded? All data will we treated confidentially and will only be used for this research. Would you mind if your name is mentioned in the research or do you wish to be treated anonymously?

2. Could you please tell us briefly about your job role, position, and years of experience? Could you please tell us about your involvement in the aid activities during the armed conflict in August 2008? Which were your responsibilities by that time? How was Georgia Red Cross Society involved in the relief activities during the armed conflict?

3. Could you please describe how your supply chain for relief operations in general is structured?

4. In the literature the humanitarian supply chain process is typically divided into a preparedness, response, and recovery phase. How does this look like in your organisation? Could you please describe the major activities you perform during the preparedness, response, and recovery phase? Was this the same during the armed conflict in 2008?

5. How did you manage demand and inventory during the armed conflict in 2008? Did you keep stocks and why? How did your demand and inventory management approaches differ during preparing, responding, and recovery activities?

6. How do you ensure transparency of inventory movements in the warehouses and during the distribution to the beneficiaries? Do you use specific IT systems for that?

7. After the armed conflict in 2008 started, could you please describe which actions you took for assessing the needs of the beneficiaries? In your opinion, would other actions possibly have increased the speed and accuracy of this process? How did you ensure a fast delivery of the required relief items to the disaster locations?

8. What type of partnership did you have with your suppliers? Was it based on single purchases or long-term contracts? Why did you prefer this purchasing practice? How did your sourcing strategy differ during preparing, responding, and recovery activities?

9. Did you collaborate with stakeholders, such as other aid organisations or the government? If yes – what type of collaboration was it and how beneficial was it? If not – why did you not collaborate? How did your collaborations differ during preparing, responding, and recovery activities?
10. How do you ensure the constant development of your employees? Have you changed this approach after the armed conflict in 2008 and if so, why?

11. How do you transfer knowledge and past experience within your organisation? Which processes do you follow to document lessons learned after a relief operation?

12. In which ways do you use the experience from previous relief operations for future improvements?